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Covers: Front: Northern Saw-whet Owl. Photo by Gary Bortolotti.
Back: Saw-whet Owl trying to conceal itself behind its wing.
Photo by Gary Bortolotti.

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BIENNIAL REDPOLL INVASIONS

C. STUART HOUSTON and MARY I. HOUSTON, 863 University Drive, Saskatoon SK S7N 0J8, and ALAN R. SMITH, Canadian Wildlife Service, 115 Perimeter Drive, Saskatoon SK

Redpolls invaded Saskatoon in unprecedented numbers during the first three months of the year 2000. Arguably, this was the most talked-about bird event of the year, particularly among members of the general public. Some days the Houstons' telephone rang repeatedly, with casual feeder-watchers asking the name of the little birds, often adding that these were a species they had not seen in previous winters. Almost without exception, those with feeders reported 20 to 40 redpolls visiting daily. Ninety-year-old Mary McIntyre had over 50 at 410 Willow Street. Pat and Don Adams had up to 100, and saw their last redpoll of the season on March 31.

Everyone agreed that redpoll numbers were greater than ever before, but this was anecdotal information. We asked ourselves: How many redpolls were present? How long did they stay in Saskatoon? How widely were banded birds distributed within the city? How widespread was this year 2000 redpoll irruption throughout the prairie provinces and how did this compare with previous years? How precise is the biennial nature of these movements? What percentage were Hoary Redpolls?

Our banding efforts this winter and previous winters provided our main source of information, which we supplemented by a review of Saskatoon Christmas Bird Counts since 1955. As confirmation of the biennial nature of redpoll visits to western Canada, we reviewed the prodigious redpoll banding record of Leroy and Myrtle Simmons of Winnipeg, 1964-1976.[5] For evidence of the widespread distribution, we looked at the Great Backyard Bird Count on the Bird Source2000 web site on the Internet.[2]

Previous evidence for biennial irruptive migrations

Two papers in 1976, one by Kennard using bird banding data, and the other by Bock and Lepthien using Christmas Bird Count data, independently reported that redpoll migrations are strikingly biennial.[1, 6] In 1983, Troy reviewed redpoll movements shown by banding records between 1923 and 1978, and found that banded birds returned to southern banding stations predominantly at two and four years after banding, but presumably did not move into settled areas in the intervening years.[8] Troy's map, based on 106 recoveries from a winter subsequent to banding, showed a movement from the northwest, mainly Alaska, to the southeast, as far as the New England states.

These three papers, along with Hochachka et al.[3] who used FeederWatch records to analyze the major irruptive migration of 1993-94, indicate that redpoll irruptions are evident in the last two weeks of odd-numbered years, and intensify in the first months of even-numbered years. Bock and Lepthien found "a general but not complete synchrony" with seven other species of boreal forest birds: Evening and Pine grosbeaks, Red and White-winged crossbills, Purple Finch, Pine Siskin, and Red-breasted Nuthatch.[1] They postulated that the driving factor for these irruptions is the biennial variation in conifer cone crops and birch seed production, and reported "superflights" of a massive extent in 1935-36, and 1969-70. Kennard found that redpolls arrested their migration wherever they found heavy supplies of Yellow Birch seeds, yet the birch cycle occurred every three or four years and hence was not strictly biennial.[6] Hochachka et al. admit that we still do not know whether the ultimate cause of irruptive migrations is high seed production causing northern retention of high redpoll populations, or low seed production causing massive emigration from the northern breeding grounds.[3]

Bird banding in Winnipeg, 1964-1976

Leroy and Myrtle Simmons banded a prodigious 22,504 Common Redpolls in their yard on the Seine River in Winnipeg between 1964 and 1978.[5] With the exception of 1969, when numbers were building up to the unusually large redpoll invasion early in 1970, redpoll bandings were almost exclusively in even years (Fig. 1).

Bird banding in Saskatoon, 1964 - 2000

Although redpolls occur every winter in rural areas adjacent to Saskatoon, their appearance at the Houstons' backyard banding station at 863 University Drive has been confined only to even years – with one exception, the aberrant year of 1969 (Fig. 2). The number banded during 13 even years was 2235 and during 1969 was 104.

Year 2000 was the most exceptional even year to date. Between January 5 and March 20, 2000, Stuart (CSH) and Mary (MIH) banded (right leg) 1438 Common Redpolls at 863 University Drive, using McCamey Chickadee traps.

Figure 1. Common Redpoll (CORE) banding at Winnipeg

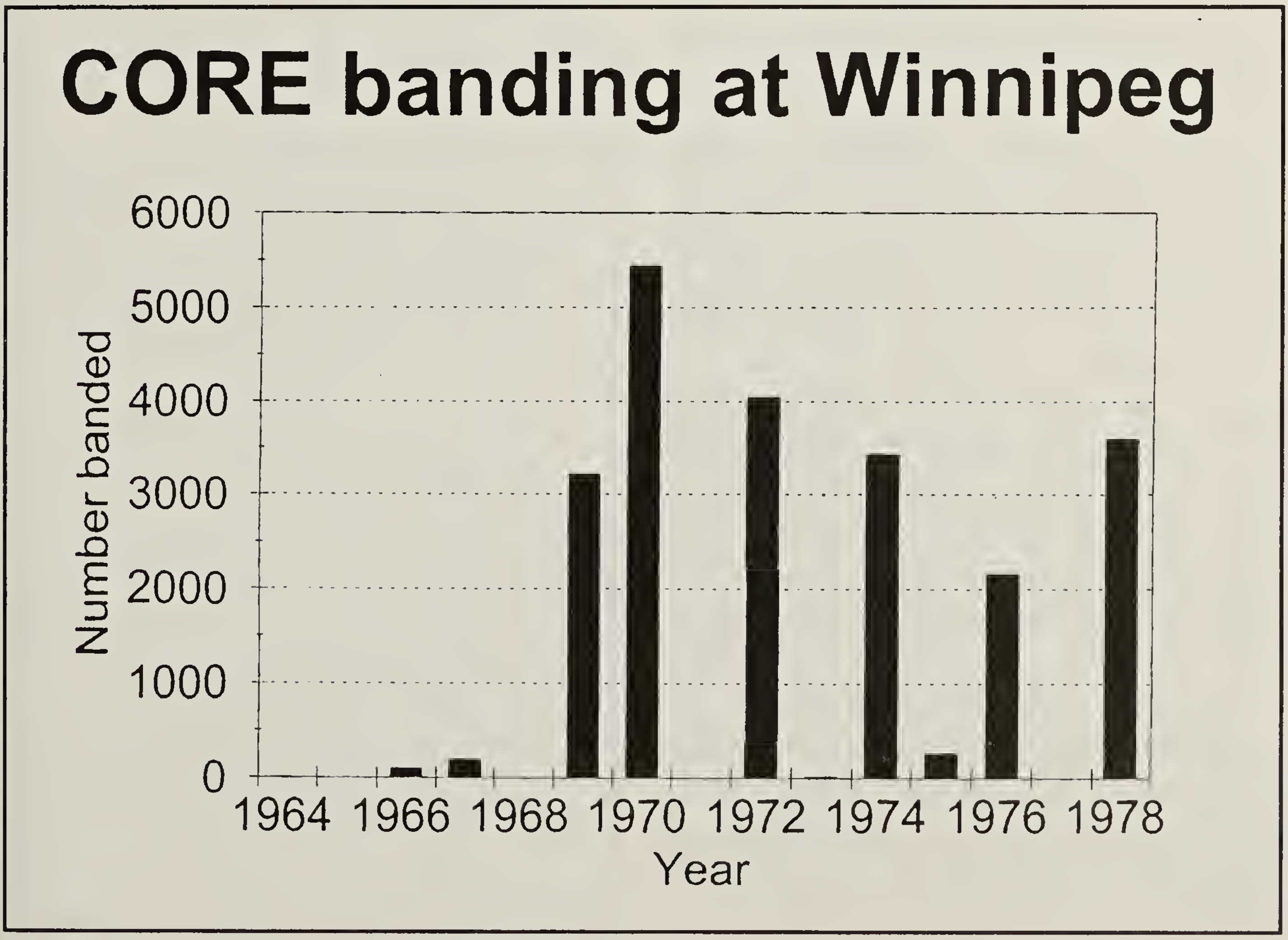
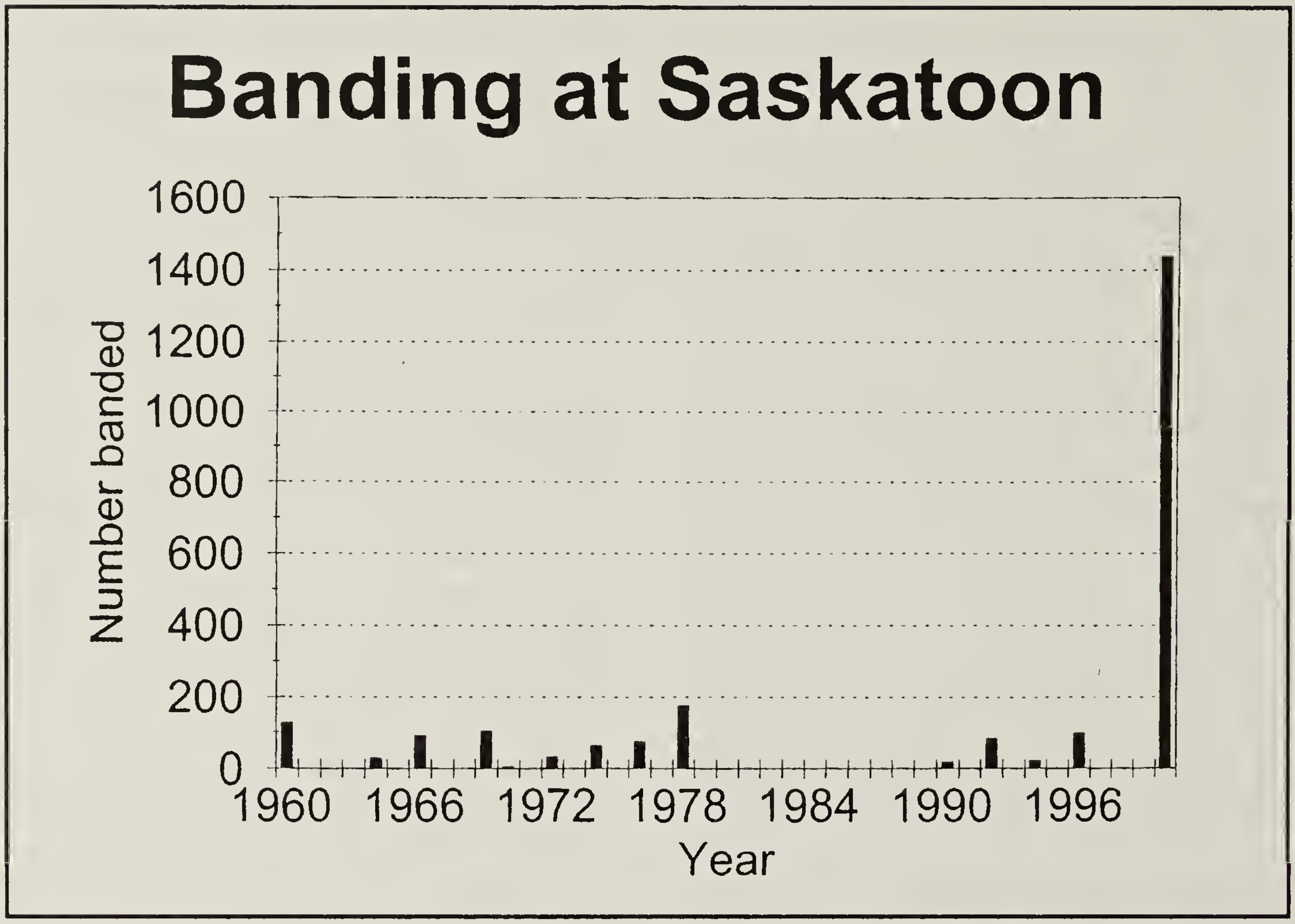


Figure 2. Redpoll banding at Saskatoon



When the bird steps on a treadle to obtain niger seed, the door drops down. Sunflower seeds were also available, but the niger seed was the main attraction. (Only 9 kg of niger seed was used.)

The Houstons retrapped 183 individuals from 1 to 13 times, for a total of 251 retraps. Some of the redpolls banded in early January stayed well into March, e.g. one banded on January 8 was retrapped on March 15. We also caught two of Al Smith's redpolls, one at our banding station, 3.2 km distant from Al Smith's, and another when we left traps for one day at Pat and Don Adams, 0.6 km distant, to determine the origin of birds banded on the left leg.

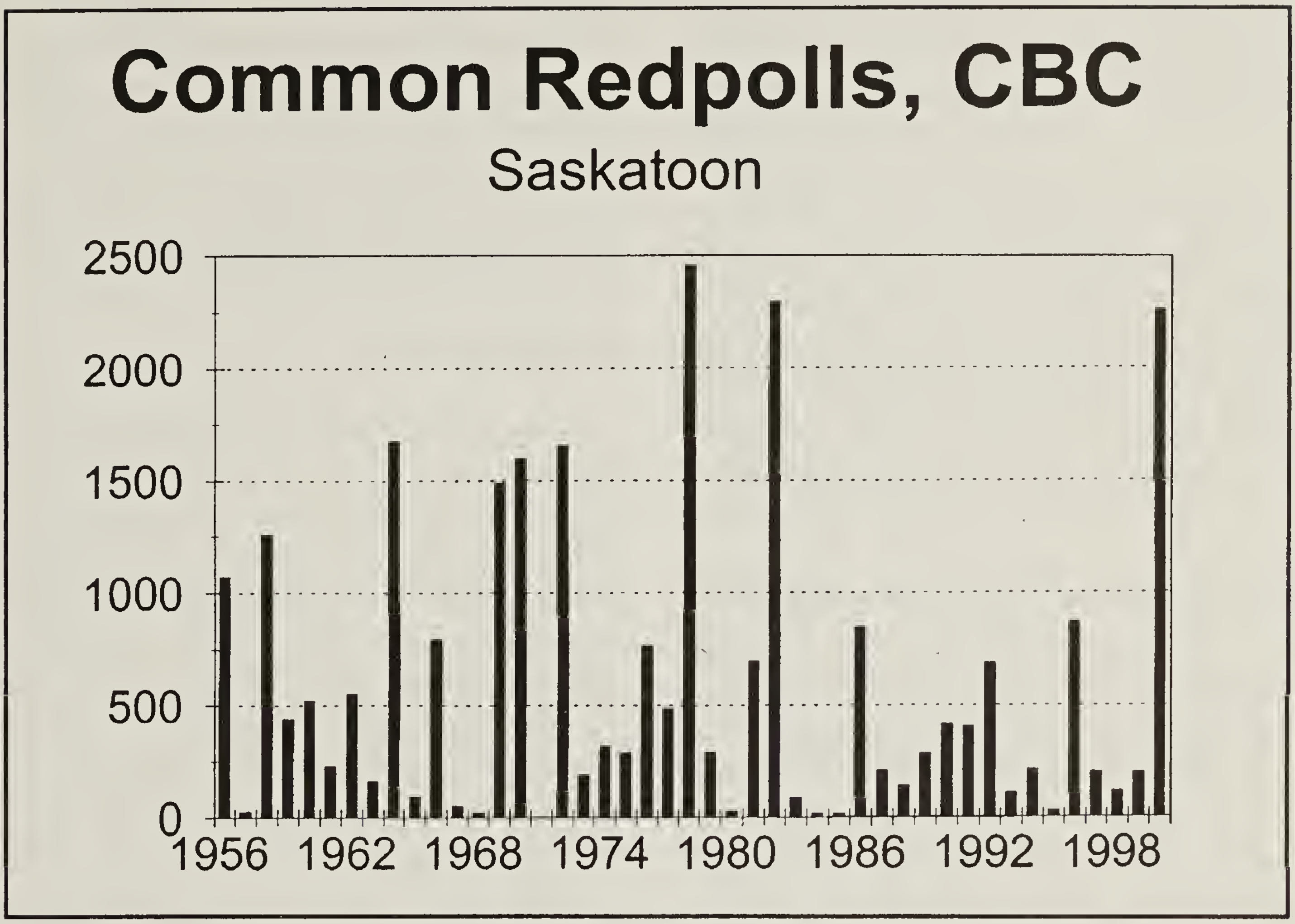
Between February 1 and March 15, Al Smith banded (left leg) 154 redpolls in his yard at 318 113rd St.West. He had 36 recaptures of 24 individual banded redpolls and caught 3 of the 1438 banded by CSH and MIH.

Perhaps the first portent of the massive redpoll invasion of the forthcoming winter was the sighting of an estimated 75,000 Common Redpolls passing through Sheep River Valley, in the foothills west of Turner Valley, Alberta.

W. Smith and R. Wershler sighted them before a blizzard on 31 October 1999.

(R. F. Koes and P. Taylor, Prairie Provinces Fall Migration, North American Birds 54:65-66, 2000).

Figure 4. Common Redpoll numbers from Saskatoon Christmas Bird Counts (CBCs)



Wisconsin (707). Redpolls were also seen at more feeding stations than any other species in Newfoundland and were in second place in Yukon Territory, NorthWest Territories including Nunavut, and in North Dakota. In total numbers of individuals, however, Common Redpolls were first in the preceding four jurisdictions and also in Alaska, Quebec, New Brunswick, Prince Edward Island, Vermont, New Hampshire and Maine.

Miscellaneous

Leland Greenfield reported from Nokomis, SK on January 21, that he had more redpolls than ever before at his feeder, with five visiting each minute. He had already fed them 135 kg of sunflower seed. A few of his redpolls died; a necropsy at the University of Saskatchewan revealed that salmonellosis was the cause of death. Dennis Fisher also submitted a specimen that proved to have peritonitis caused by Salmonella. No diseased birds were detected at the banding stations in Saskatoon.

Proof of the widespread nature of the irruption is evident from the banding of 2576 Common Redpolls, mostly in March, by the Timiskaming Banding Group in extreme eastern Ontario.[7] One redpoll was resident there for 2 months and 23 days.

Discussion:

How many redpolls were present in Saskatoon in the year 2000?

Banding sampled 1592 individuals. These bands on redpolls then became a marker that allowed at least a rough "ball-park" assessment of the number of redpolls, certainly with more confidence than if none carried bands. It appears there was a loose agglomeration of redpolls throughout the city, consisting of sub-flocks moving from feeder to feeder. Before making a numerical estimation, several assumptions are necessary. One can reasonably assume that sightings of banded birds were birds banded in Saskatoon the same season. Second, this is not a closed population, but a constantly changing one, with redpolls coming in and others leaving. Third, the presence of numerous bird feeders (though the number is unknown) distributed unevenly throughout the various neighbourhoods, could artificially attract and maintain populations for a longer term than would occur in an unmanaged natural system.

Next, one must appreciate that if there was constant or extensive movement of redpolls into and out of the city, any calculation of a city-wide population of redpolls at a given time would result in a low estimate. On the other hand, if there were three or four large flocks that did not mix at all, in different corners of Saskatoon, the estimate would be high. These two influences might tend in the direction of cancelling each other.

One can then use the data from each banding station. The first method is to calculate a modified Lincoln Index – the number recaptured divided by the total number banded. For University Drive this is 183 divided by 1438, or 12.7% of the total, which would have been 11,322. This is the lowest population estimate from the various methods used. Smith's mist-netting showed recaptures of 24 birds, or 15.6%. These figures depend to a large degree on duration of effort, since recaptures increase with time.

Next one must consider sightings of banded birds at other feeding stations in the city. The highest daily number of banded birds seen at a feeder distant from the banding stations was between 1 and 4 in a flock of 100 at the Adams' feeders, which would give a multiplicative factor of 100 (100 ÷ 1) or 25 (100 ÷ 4). If 4 per 100 were an approximate sampling of the city flock, we could use 25 as a conservative multiplicative factor and say that the city population of redpolls must have been 25 times the combined total of birds banded by Houstons and Smith (1592), or at least 40,000 redpolls. If 1 per 100 was accepted as a sample number, then 100 x 1592 would mean a flock of over 150,000 redpolls.

Some Saskatoon feeders were against a window and allowed favourable conditions for seeing a band when present – yet at some, in spite of many hours of observation under ideal conditions over two months, no band was observed. Most of the remaining feeders had only one sighting of one banded bird within a flock of 30 to 50. For these feeders combined, one might assign for an average day a multiplicative factor of at least 50 (i.e. 50 ÷ 1) which when multiplied by 1592 is roughly 75,000 redpolls.

It would be imprudent, because of the small numerators involved, to derive a population figure from the Houstons' sample on University Drive of the birds Al Smith banded 3.5 km away. However, for argument's sake, if the Houstons' one recapture of the 156 redpolls banded by Smith, could by any stretch of the imagination be considered a representative sampling of the flock, it would mean a multiplicative factor of 150, and thus a total count of 235,000 birds. Smith's sample of Houston banded birds (3/1438) would provide a an even higher and less credible factor of about 480, and a population reaching as high as 750,000.

With due cognizance of the caveat concerning the percentage of redpolls remaining in the city at a given time, we would nonetheless offer from the banding data a best-guess estimate of between 40,000 and 150,000 redpolls having visited Saskatoon, even if not all were present at once. More extreme numbers range from 11,000 to 750,000 redpolls. Perhaps the next irruption of this magnitude won't come for another 30 years, but if it does, recruitment of another ten banding stations would help hone these methods of estimation.

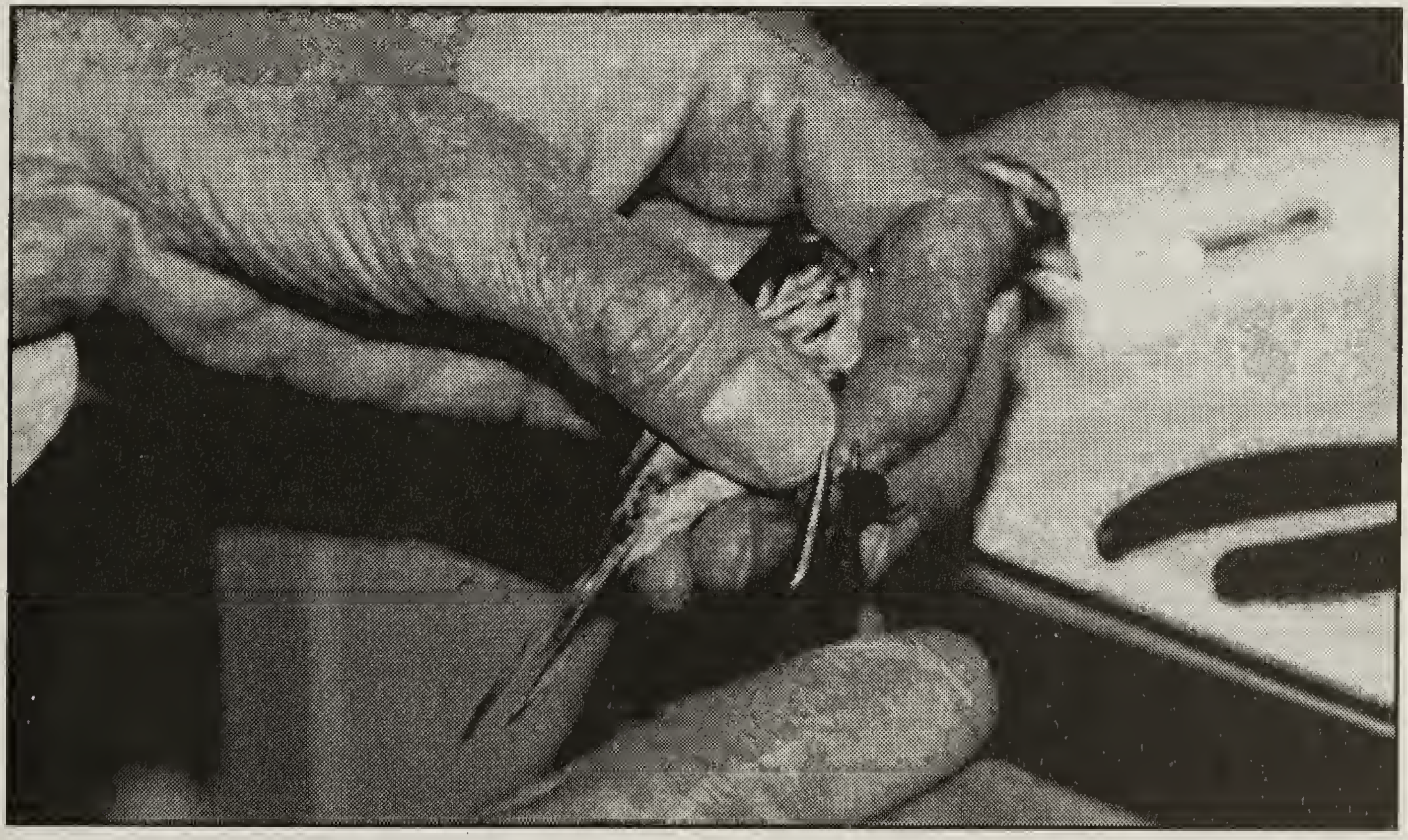
Redpoll occurrence in Saskatoon in the year 2000.

Redpolls were present at feeders in the city for roughly three months, from January 5 through March 31. The longest interval between trappings of an individual was January 8 to March 15, 67 days. Of redpolls banded through January 25, there were retrappings of four birds at 48 days, two at 51, two at 52, one at 54, two at 55 days, and one at 56 days. Of course we have no way of knowing how representative such long stays were among other members of the flock that were not retrapped, nor to what extent these particular individuals had become dependent on the University Drive feeding station.

Banded redpolls were sighted at 11 Saskatoon feeders, between 0.6 and 6.6 km from the banding site. Not one was sighted west of the central city core. In addition, two of Smith's redpolls may have been present at a farm 40 km south of Saskatoon.

CSH and MIH banded a total of five redpolls of the *rostrata* subspecies, with a noticeably larger body and a more massive beak, almost reminiscent of that of a grosbeak : two on January 8, two on February 1 and one on February 4. Al Smith captured one on February 19.

Although some birders, including J. Frank Roy, have worried that some observers over-diagnose Hoary Redpolls in mixed flocks on Christmas Bird Counts, our figures suggest otherwise. Observers here list the very pale redpolls with white rumps (not necessarily immaculate white) and pure white undertail coverts,[4] as Hoary Redpolls. All other redpolls are presumed and counted as Common Redpolls, even when a good look is not obtained; rarely is a flock classified as "unknown redpoll species." The Saskatoon CBC, 1955-1999, gave 1.3%



Banding a Common Redpoll ***Hans S. Dommasch***

as Hoary Redpolls. Saskatoon banding, 1964-1999, showed 1.3% of redpolls were Hoary Redpolls. During the recent irruption in the year 2000, Al Smith had 2/156 or 1.3% Hoary Redpolls, but in a larger sample (the Houstons' banded birds) the percentage dropped to 11/1449 or 0.8%.

The percentages of redpoll species over years of Christmas counts, and those examined in the hand by banders, give some credence to the ability of CBC counters to reach a correct diagnosis. There are no doubt regional differences. The Simmons in Winnipeg, 1964-1978, had a higher percentage (830/23,334), of 3.6% Hoary Redpolls.

Conclusion

In Saskatchewan and Manitoba, every year since records have been kept (except 1969), redpolls have appeared in high numbers at city feeders in January and February, only in even-numbered years. The birch seed crop is mainly but inconsistently biennial.[1, 6] Our best guess, chosen from the two possibilities offered by Hochachka et al., is that the low seed productivity hypothesis predominates, as follows. When Dwarf Birch, *Betula glandulosa*, on the redpoll breeding grounds of arctic tundra, produces few or no seeds, the redpolls begin an irruptive migration to the south and east, the extent depending on how severe the seed failure is. In alternate years, however, when birch produce massive amounts of seeds, most redpolls winter farther north, although sometimes spread short distances south to consume seeds of other *Betula* species as necessary. Their southward movement usually stops when and wherever sufficient birch seeds are encountered. The few redpolls that reach settled areas in such odd-numbered years, tend to spend the winter in rural areas, and rarely appear at feeders within the city.

Without question, these movements in North America adhere remarkably to a precise two year schedule, perhaps more so than most other cyclical phenomena in nature. Although the monitoring methods of amateur observers are sufficiently inconsistent to preclude absolute certainty, the winter of 1999-2000 may have been the most extensive of these irruptions ever recorded.

Acknowledgements

We thank Donald S. Houston for statistical analysis.

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THE PEREGRINE FALCON AND THE SORA

ROBERT W. NERO, 546 Coventry Road, Winnipeg, MB R3R 1B6

Before dawn, the Peregrine Falcon flies steadily north over the top of the city and then out across fields. Ten minutes later it reaches the big marsh, and in the half-light skims over the reeds and water on set wings. Its flight is swift and surprisingly low. The sudden appearance of the falcon, just visible against a pearl-gray sky, startles a duck into flight, but the falcon courses onward. At a bay where marsh grasses give way to a pastured meadow the falcon circles once, silently, then with a burst of speed it cuts across the pasture. In the short, damp grass two Soras feed hurriedly, picking numb grasshoppers gleaming metallically in the dawn light. First one Sora, then the other rises in flight, fluttering awkwardly, feet dangling, to return to the safety of the marsh. But the falcon is upon them before they are aware of its presence; there is no perceptible pause as with one foot it snatches a Sora, lowers its head to crush the prey's head with its scimitar beak, and heads back towards the distant city, the Sora held tightly against its body.

When Gordon G. Graham found a dead Sora lying on the sidewalk on Broadway Avenue in downtown Winnipeg on March 8, 2000, his first thought was: "What is a Sora doing here at this time of the year?" Because the plumage appeared clean, Graham assumed that the carcass was fairly fresh. Upon closer examination at the office, however, it was determined that it was actually the old remains of a Sora, minus the head and one wing. This bird had probably been predated by a Peregrine Falcon the previous fall, partly eaten and left on top of a nearby building, then subsequently blown off by the strong wind on the day Graham found it. The location is not far from the Radisson Winnipeg Hotel (formerly Delta Winnipeg Hotel), a known nesting site of Peregrines. The female Peregrine that nested there the past 2 years has, in fact, overwintered locally.

The Sora Rail, or Sora as it is now officially known, is a long-legged, short-tailed bird, a little smaller than a Robin, residing in marshland habitat. Seldom seen in flight on the breeding grounds, these secretive birds are best known by their distinctive calls. Yet, they are capable fliers, migrating annually from northern wetlands to and from southern U.S. wintering grounds. C.W. Nash wrote: "Late in the autumn, just before migrating, this bird develops startling powers of flight...."[12] Despite its small size, the prolific Sora is listed in several states and provinces as a game species.

Surprisingly, of all the prey species taken by Peregrines residing in downtown Winnipeg and Brandon, the little Sora is one of the most frequently taken, ranking second after Rock Doves (pigeons). The other top species are Black-billed Cuckoos, Northern Flickers and Pied-billed Grebes.[3] "Sora, Northern Flicker, and Black-billed Cuckoo are relatively uncommon in Winnipeg as shown by the prey availability study, but they are selected for prey during the early to mid-season, suggesting that there is a local irruption of these two [sic.] species, or there is some energetic benefit to peregrines when they hunt these birds."[3]

"The high number of Soras and Pied-billed Grebes found [at the former Delta Hotel, a Peregrine nest-site in downtown Winnipeg] suggests that the male was hunting marsh sites, perhaps even going as far as Oak Hammock [Marsh]. Shorebirds, including a Ruddy Turnstone in fall plumage, presumably taken last year, further support this idea."[10]

One early morning in the 1950s, while studying Red-winged Blackbirds at Madison, Wisconsin, I was surprised to find three Soras foraging in a grassy meadow dozens of yards from an adjacent marsh, picking their way through the short grass like little hens. I saw one or more Soras in a similar situation on two or three other occasions. More than a century ago at Portage la Prairie, Nash commented on the ability of the Sora to walk about: "just about the time of departure [in fall] it may be found in most unlikely places, and it is just possible that when so found it may have been travelling southwards on foot."[12] Street remarks how he caught an adult and a juvenile Sora at his banding station at Nipawin, Saskatchewan, more than a mile from water, May 3, 1945 and August 26, 1957.[7] On the other hand, one spring morning in a residential area of Regina, I watched in surprise as a high-flying Sora killed itself when it struck a hydro wire behind our home.

Soras residing in my marsh study area at Madison often entered traps I'd set for Redwings and baited with white bread, in some instances going into traps three feet above the water.[9] Jean Bancroft wrote about a Sora which she saw one day "perched on a branch of an oak tree, approximately 18 feet above the ground" at Whytewold, Manitoba, and she noted that Bent's account mentions only one such case, a bird seen settling onto a branch of a mangrove tree in Bermuda in 1847.[1] Closer to home, at Brooks, Alberta, Randall found an active Sora nest on June 10, 1945, in a willow bush and four and one-half feet above the water. Fourteen eggs laid in this nest hatched successfully.[11]

The usual arrival date for the Sora in southern Manitoba is early May, the earliest arrival dates reported being May 1, 1977, at Oak Hammock Marsh, and May 4, 1976, in the southwest.[5, 8] The earliest arrival dates for Saskatchewan are: April 17, 1976 – Regina; April 27, 1958 – Qu'Appelle; April 18, 1933 – Prince Albert; May 2, 1933 – Nipawin.[2, 4, 7] In northern Minnesota, the earliest arrival is April 20, and April 1 in southern Minnesota.[6] Of course, since we identify the Sora mostly by its call, it could be present in spring some time earlier than we're aware. This is a hardy species; one Sora even overwintered in southern Minnesota, November 30, 1893 to January 24, 1894.[6] The Sora has been recorded in Manitoba as late as October 16, 1976, at Oak Hammock.[5] Callin reported one in the Qu'Appelle Valley, Saskatchewan, October 25, 1904.[4]

Peregrine Falcons are adept at finding and capturing prey, mostly birds in flight, from shorebirds to ducks – it is their way of life. Along with other Peregrine watchers I have looked on in wonder as they successfully pursued prey, but some things have puzzled me. Birders have difficulty finding Black-billed Cuckoos in and around Winnipeg, for example, yet Peregrines residing here seem to routinely pick them off. As to Pied-billed Grebes, a species seldom seen in flight, how Peregrines nab these skillful divers is a mystery. And the Sora as a prey species?! Clearly, Peregrines have special knowledge and hunting strategies as yet unrevealed. As Jim

Duncan noted when he reviewed this article: “The unknown aspects, the element of surprise, this is what makes observing nature so compelling.”

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OF RAVENS, GULLS AND A PELICAN

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A few years ago, I and two companions were diverted from our fishing at Damour Lake (north of Blaine Lake) by the aerial display of six Common Ravens. The flying gymnastics lasted more than an hour. A steep hill abutted one shore, and the birds were continually wheeling about, riding in and out of the rising air currents caused by strong winds. Dives, tumbles, and wing-overs were part of their performance.

Taverner describes ravens' behaviour as “sometimes very playful in the air.” [2] Indeed, at times these birds appeared to be taking turns in soaring up and then swooping down; occasionally, two birds might engage in a similar movement jointly. What was most interesting to watch were the embellishments often added: a raven's apparent out-of-control tumble, with wings flapping about, then an easy recovery – or a smoothly executed flipping over onto its back, with wings fully extended, followed by another flip to right itself. These moves were often combined with a downward plunge, all accomplished just above the crest of the hill, where the updrafts were greatest.

This past summer I have again been entertained by ravens, four of them this time, in my home town of Rosthern (a decade ago their mere presence in town, especially in summer, would have been noteworthy). They were also engaged in gymnastics, only now gale-force winds were blowing against the Saskatchewan Wheat Pool elevator at the end of the block on which I live. The ravens were doing barrel rolls – those aeronautical manoeuvres consisting of a continuous, complete roll over – about the roof of this 130-foot-high structure.

Then on 13 June 2000, I had occasion to watch the aerial antics of two other species of birds at Greenwater Lake. At dusk, some Ring-billed Gulls stood along the shoreline, preening themselves. Now and then, a gull would lift off and sail in slow-wheeling arcs above me, before rejoining the others on the sand. There was an onshore breeze and, with trees behind me, probably some rising air currents to sail upon. Meanwhile, an American White Pelican, which I had seen earlier in the nearby marina, flew low over the lake and landed several hundred yards away in the water.

I continued watching the gulls and had tilted my head back to observe two of them sailing 20 feet above me, making a 50-foot-wide circle. All of a sudden, the pelican was there too, a part of the "circle game," and following one of the gulls ("following-the-leader," if you like).

When the gull dipped lower or swung higher, so did the pelican, always remaining 5 to 10 feet behind. They made one full circle before the gull flew off tangentially, only to loop back into its former circular course. The pelican replicated the manoeuver, but came out of it at a slightly higher plane. Thereupon it swooped down and narrowly passed over the gull (in effect, "buzzing" it).

While the ravens had no apparent purpose to their actions (other than playing), the pelican may have been trying to get the gull to disgorge food. Or was the larger bird, in part, possibly taking advantage of an opportunity to do what, according to Pough, the species seemingly "enjoy[s]" – "circling in small flocks"? [1]

The incident ended with the pelican continuing on and away, in a straight line, back to the marina, and the gulls dropping down to be once more among their fellows at the waterline.

1. Pough, R.H. 1951. Audubon Water Bird Guide. Doubleday, Garden City, NJ.

2. Taverner, P.A. 1928. Birds of Western Canada. National Museum of Canada, Ottawa.

"On one occasion, I saw a magpie on the ground and running and jumping about in a highly erratic manner. My first thought was that the bird was having an epileptic fit. Then, when I viewed the magpie in a telescope, I could see it was actually chasing a mouse or vole , which was frantically trying to escape by darting around in circles. The prey was eventually caught, held in the feet and killed by several hefty blows from the bill." T.R. Birkhead *The Magpies*. p.104

PIGMY-WEED *(Crassula aquatica (L.) Schoenl.)* AND SPURREY KNOTWEED *(Polygonum spergulariaeforme Meisn.)* NEW TO SASKATCHEWAN, AND COMMENTS ON FIVE OTHER RARITIES FOUND 1998-1999

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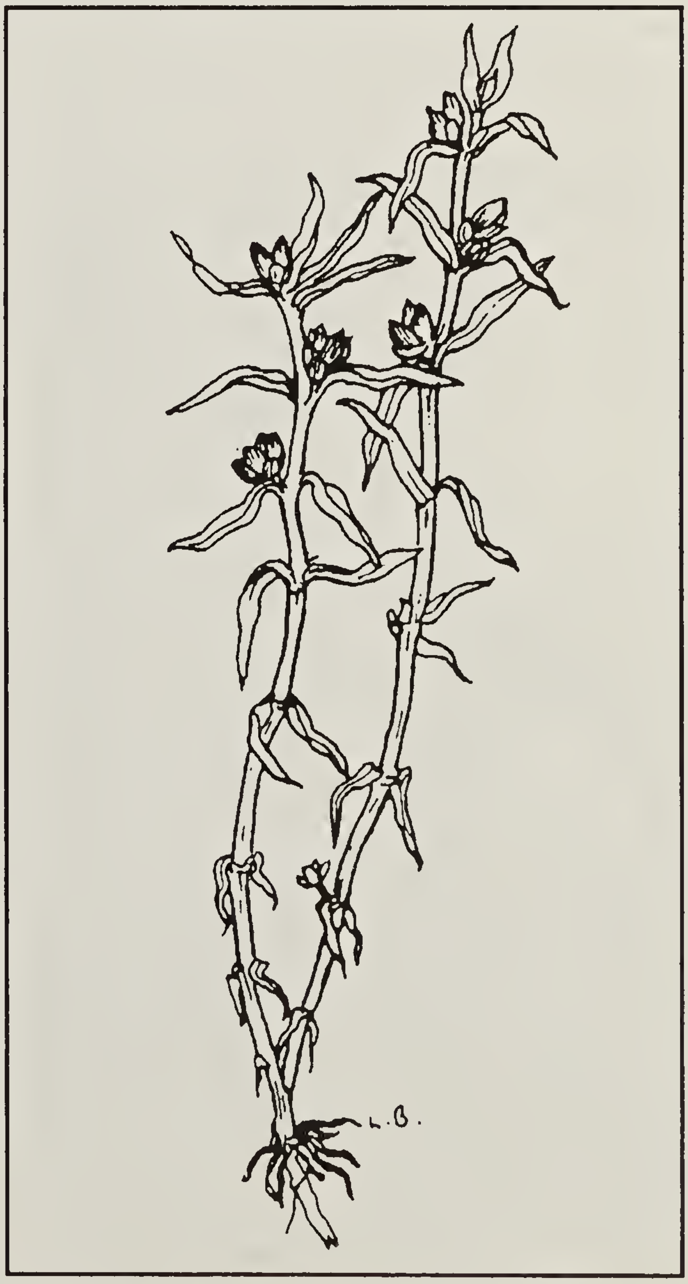
Pigmy-weed

The most interesting find of 1999 - and for a good many years! - was Pigmy-weed, *Crassula aquatica* (L.) Schoenl. (*Tillaea aquatica* L. of available floras) (Fig.1). It was taken as collection # 5405 on L.S.D.9 of 26-3-XXX W3rd [a], north of Altawan (a siding which, with its railroad, now no longer exists), 30 km west and 6 km south of Consul, on 7 July 1999 where it was abundant on a dry, ungrassed pan set into low, dry prairie.

I called this depression a pan rather than a slough, as its surface was flat and 15 - 30 cm below the level of the almost equally flat prairie. It might be likened to an ulcer on the grassland surface. The exposed soil was queer stuff, being whitish, not obviously saline and seemingly of silt texture, though it must have had some clay content since it dried to hard lumps.

The vegetation of this pan consisted of much Pigmy-weed, lots of Woolly-heads (*Psilocarphus elatior*), minor amounts of Popcorn Flower (*Plagiobothrys scouleri*), stunted Mudwort (*Limosella aquatica*) and something in the *Polygonum aviculare*

Figure 1. Pigmy-weed [reproduced courtesy of the Canadian Museum of Nature, Ottawa, Canada]



complex (a Doorweed), and the odd culm of Western Wheat Grass (*Agropyron smithii*), with a good deal of bare ground between plants.

My guess about the origin of the pan is that it is a lump or erratic of marine shale in the thin till of the area, too barren to support prairie grasses and therefore slightly sunken below the level of the grassland. After the snow melt of a snowy winter, or after heavy rainfall in early summer (as was the case in 1999), the pan fills up with a shallow layer of water, which in this country south of the Cypress Hills, doesn't take long to evaporate. Thus, mud annuals have a chance to get in a life cycle if they are quick enough about it.

Pigmy-weed is in the family *Crassulaceae,* along with the stonecrops of the genus *Sedum*, and like them, has a fruit that is a cluster of follicles. It has opposite, fleshy leaves a few millimetres long, and a cymose inflorescence like chickweed. The plant material I saw and collected was 1-1.5 cm high and bright red in life (brown when dry). It was in seed and presumably was getting ready to die from drouth, as the pan was bone dry.

The distribution of Pigmy-weed is perhaps the oddest thing about it. Although circumboreal, it is not reported for Manitoba or Alberta, much less Saskatchewan, by Scoggan.[12] To the south, in Montana, it is not mentioned by Dorn, while the earlier writers, Booth and Wright, describe it but show no localities on their map.[4,2] Farther southeast, it is not reported for the U.S. Great Plains.[7] Other than from southern BC, the only report from western Canada is from Yellowknife on the north shore of Great Slave Lake [11,3]

Make sense of that Great Slave Lake report if you can; but it appeared to me not wholly impossible that Pigmy-weed could be found on the prairies. Indeed, on an earlier foray to Altawan on 30 June 1978, I had picked up a sprig of a plant with opposite leaves and reddish flower buds, which I thought for a moment might be Pigmy-weed, then on second thought, guessed it as Mud Purslane (*Elatine* sp.) and threw it away. On third thought, I wanted another look, but could find neither the sprig I had thrown away nor any other plants like it. The heavy rains of spring and early summer 1999 must have filled enough ephemeral pans to bring forth populations in this area. I did see another pan full of Pigmy-weed and Woolly-heads the same day, 100 yards southwest of the collection site, on the way back to the vehicle.

Spurrey Knotweed

Also to be reported as new to Saskatchewan is Spurrey Knotweed, *(Polygonum spergulariaeforme* Meisn.)

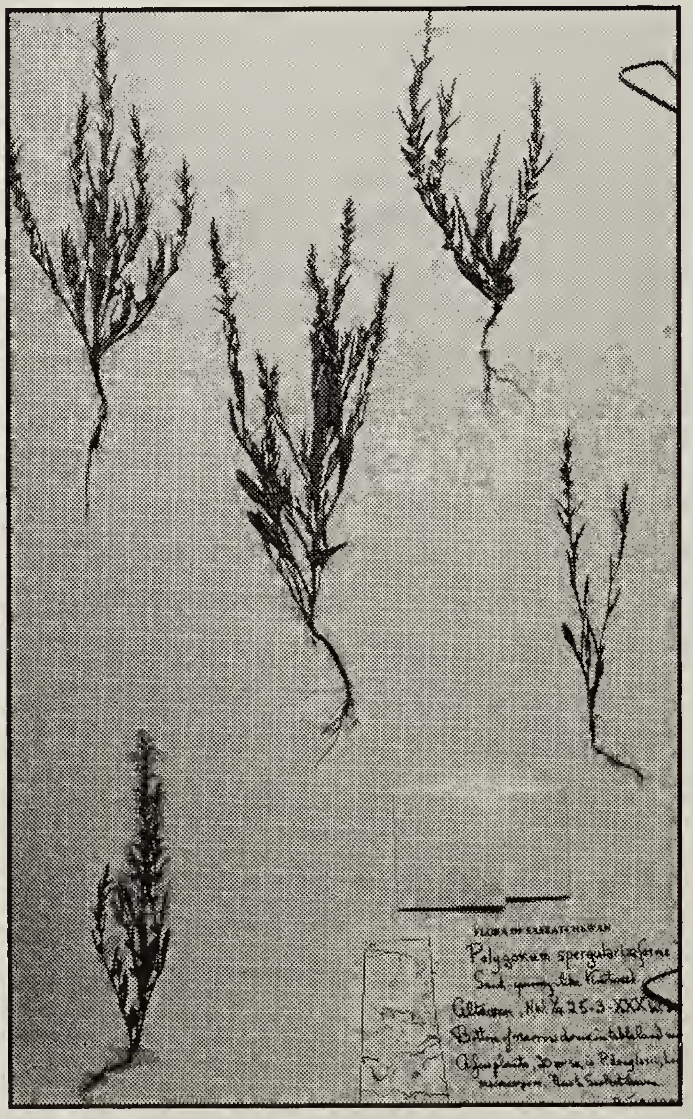


Figure 2. Spurrey Knotweed

(Fig. 2). Collection data are as follows : collection #5407, 8 July 1999, bottom of narrow draw in tableland margin, N.W. 1/4 25-3-XXX W. 3rd (thus near vanished Altawan), a few plants - 20 or so - with Douglas' Knotweed (*Polygonum douglasii*). I saw another population of the plant the next day on the same quarter but in a different ravine.

This small knotweed, 1-2 dm high, looks like Douglas' Knotweed in being strict and erect (even though branched) with linear-lanceolate ascending leaves, but differs markedly therefrom in that the flowers, fruits and their long subtending bracts, are erect not reflexed, and are crowded, not widely spaced, along the stem.

Spurrey Knotweed differs from the erect native forms related to *Polygonum aviculare* (Doorweed), found on bentonitic clay flats and dry slough bottoms, in having shiny black achenes rather than brown achenes, more or less dull-surfaced.

It might well be objected : "You are here dealing with a *Polygonum* in Section *Avicularia*, a section of ill-defined species running into one another. What is the evidence for reporting from this section a species new to Saskatchewan?" The answer is that from the keys of both Scoggan and Hitchcock & Cronquist, the material comes out to *Polygonum spergulariaeforme* or perhaps to a *Polygonum nuttallii* Small.[12,9] These two entities are stated to differ only in that *P. spergulariaeforme* has shiny, black achenes 3 mm long, *P. nuttallii* has similar achenes 2-2.5 mm long.

I checked the achenes of all my collections in Section *Avicularia* and found that shiny, black achenes were confined to *P. douglasii* (3-4 mm long) and *P. spergulariaeforme* (2.5-3 mm long). This Altawan material, (collection #5407), had shiny black achenes 2.5-3 mm long, so may safely be placed as *P. spergulariaeforme*. Not so definite was the placement of a collection I made at Chappice Lake northeast of Medicine Hat AB - collection #4921 from L.S.D.7 in 17-14-III W 4th on 23 June 1990; shiny black achenes 2-2.5 mm long placed it in *P. nuttallii*, though there is no apparent difference in the plant body from the Altawan material. Hitchcock and Cronquist thought *P. nuttallii* merely a small-flowered form of *P. spergulariaeforme*.[9] Most likely the variation is continuous between them. So, although we have a new species for Saskatchewan, it is still in a state of taxonomic muddle, which Douglas, Straley and Meidinger have not cleared up by making these species, and a couple of others, all subspecies of the clearly different *Polygonum douglasii*.[5] Scoggan attributes both *P. spergulariaeforme* and *P. nuttallii* to B.C. [12]

Rice Cut-grass

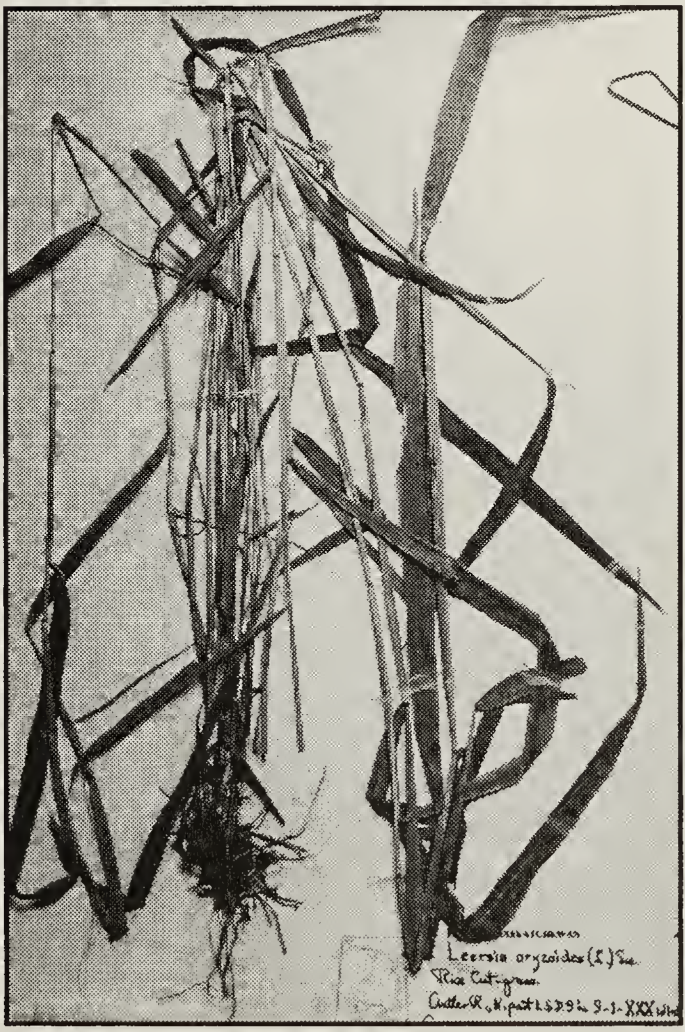

Leersia oryzoides (L.) Sw.
Rice Cut-grass
Cutler R., N. part LSD 9 in 9-1-XXX W3

Figure 3. Rice Cut-grass

Another novelty for Saskatchewan is Rice Cut-grass, *Leersia oryzoides* (L.) Sw., (Fig. 3) but I am not the first collector of this one. I had seen a specimen collected by Dr. V. L. Harms as his collection # 39709B, 30 July 1988, on the shores of Antler River on S.E. 1/4 22-1-XXXI W 1st, in a stack of unmounted material from his trips into southeastern SK in the 1980s. (The specimen has subsequently been mounted.) The summer before last, I decided to look for it, remembering of the location only that it was somewhere along the Antler River. I did remember that Harms' material, collected in midsummer, had a wide-spreading panicle as shown in the drawings in Gleason and Boivin.[6,1]

In September, my wife and I visited the most downstream point on the Antler River which one may easily attain by car in Saskatchewan, some 3 miles from the Manitoba line and 2 miles from that of North Dakota. I expected to pick out *Leersia* quickly by the spreading panicles, but both east and west of the north-south road, no such grass was to be seen along the river. Growing tired, we sat down on hummocks by the river shore west of the road. I looked around at the vegetation and saw among the bulrushes some unusual-looking grass leaves - light green, 6 - 10 mm wide (which is very wide for a grass leaf), rough and saw-toothed on the edges. I thought, "This might be *Leersia*" and examined the culms, which were swollen towards the tip. The swellings proved to contain cleistogamous panicles of *Leersia* spikelets included in the leaf sheaths. Gleason writes that these cleistogamous panicles are produced late in the season. [6]

The collection data for the Rice Cut-grass are : #5376, 3 September 1998, admixed with *Scirpus validus* on muddy bank of Antler River, N part L.S.D.9 in 9-1-XXX W1st. Rhizomatic. Also, #5428, 9 September 1999, colonies along Antler River at a reservoir on L.S.D.16 in 33-2-XXXII W 1st, with *Scirpus validus, Spartina pectinata*. Colonies every now and then.

Leersia is easy to spot when you know what to look for. The light green, unusually wide leaves will help the observer pick it out, and one may confirm the identification by feeling the saw-like, cutting leaf margins, which give the plant the name Cut-grass. Unlike the spikelets of other grasses, those of *Leersia* lack glumes; the spikelet consists only of a lemma and palea, both fringed with stiff hairs, with the included grain.

It is seen from the collection locations that *Leersia oryzoides* is known along the Antler River, for 3 ranges, or 18 miles (29 km) , in some abundance by the way. Someone should check Gainsborough Creek and the lower Souris River for *Leersia* - something I neglected to do when down in that country.

This species has a wide range east into Manitoba and eastern Canada, and south nearly throughout the United States.

Next to be mentioned are four retakes of earlier found or reported rarities.

Indian Grass

Indian Grass, *Sorghastrum nutans* (L.) Nash, (Fig. 4) was reported by Harms as being found "about 1 mile north and 0.3 miles east of Pinto, west-center of sec. 36-01-06 W2, below prairie bluff rising above the gallery woods and bordering shrub zone north of the Souris River 28 August 1986, #36953. A single localized colony of about a dozen rather small-sized plants was found."[8]

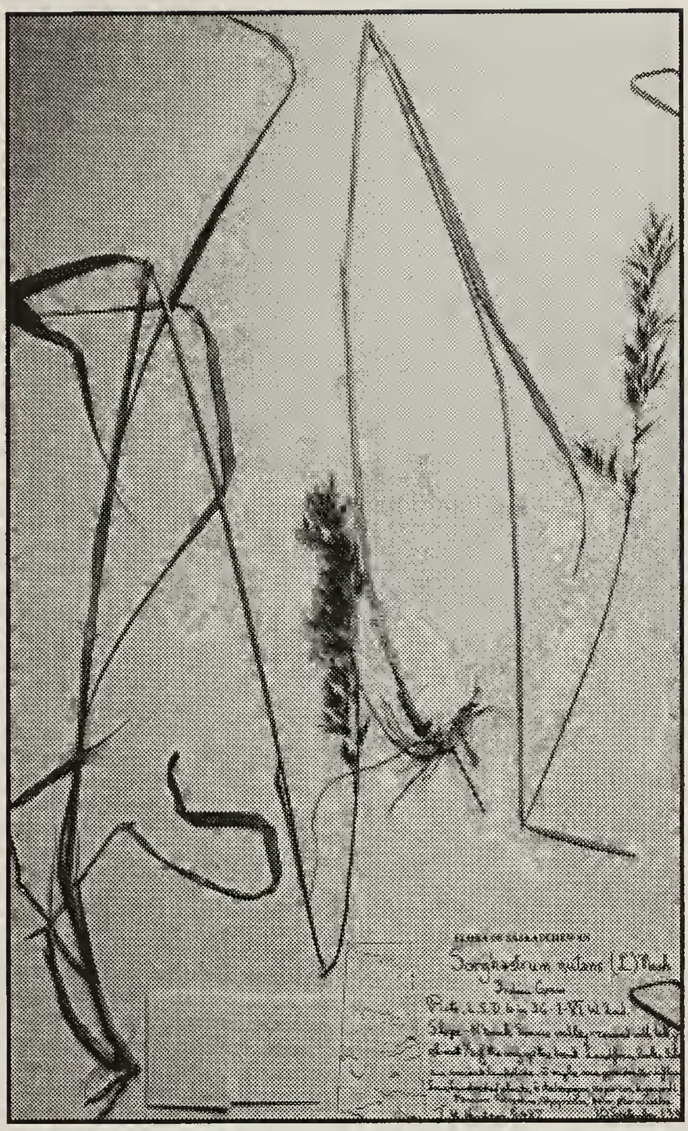


Figure 4. Indian Grass

I thought I'd try for this one too. Visits to NE 1/4 36-1-VI W 2nd on 14 July 1998 and 2 September 1998, and to L.S.D.s 11 and 12 of this same section 36 on 3 September 1998, failed to find *Sorghastrum*. But another try on 10 September 1999 found it as #5437. My field notes read : "Slope covered with tall grasses, L.S.D.6 in 36-1-VI W 2nd. Locally abundant, some hundreds of plants with *Andropogon gerardi, A. scoparius, Panicum virgatum,* etc. About 1/3 of the way up the slope of the north bank of the Souris R. Valley. Landform looks like an ancient landslide, and I suspect a slight groundwater influence. Very similar vegetatively to *Andropogon gerardi*, (Big Bluestem), differing in the long ligule (5 mm) and inflorescence a true panicle, not 2 or 3 spikes." The spikelets and flowers of these two tall grasses are very similar, comprising one fertile spikelet with a crooked awn, subtended by a whiskery rachis joint and an equally whiskery stalked sterile flower. In the field I could not tell Indian Grass from Big Bluestem until I noticed that the flowers of the former were in panicles, thus I may have passed it over earlier.

I don't know if the locality is the same as Harms' – they cannot be far apart. If they are the same, the difference in numbers of plants could be explained by the inordinately great rainfall in se Saskatchewan in spring and summer 1999, whereas 1986 was about average for moisture or a little below.

Upland Evening Primrose

Another retake of an earlier reported rarity was Upland Evening Primrose, *Oenothera andina* Nutt., (*Camissonia andina* (Nutt.) Raven) (Fig 5). I had reported this 20 years ago, based on my collection #3560, 2 July 1978, from S.W.1/4 25-3-XXX W 3rd, near

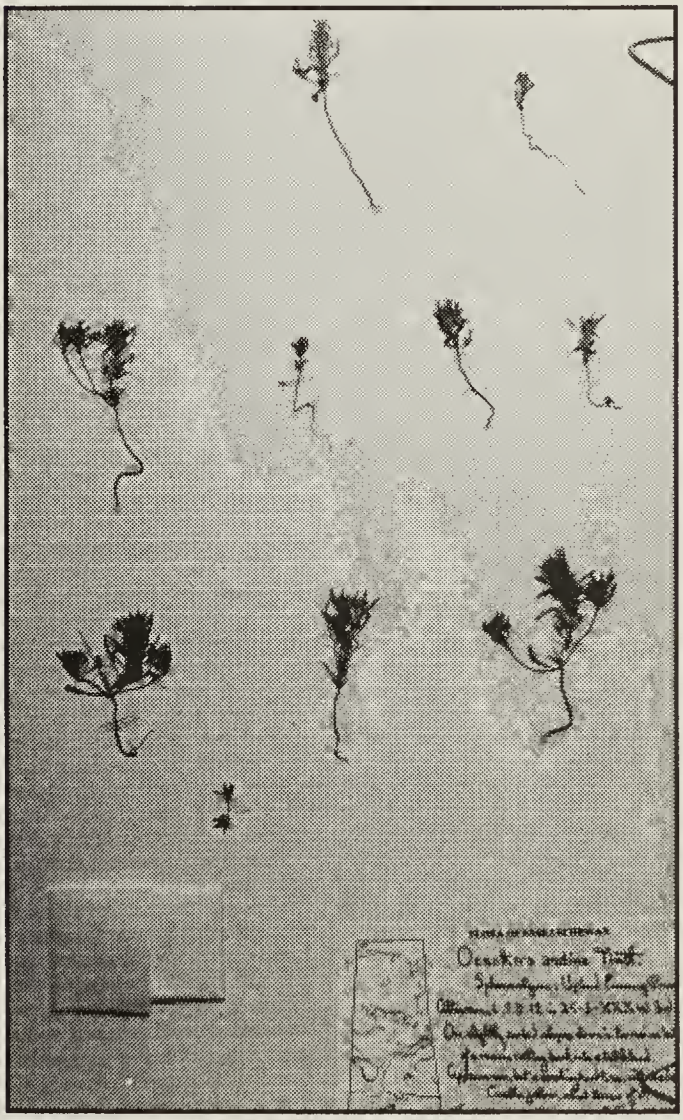


Figure 5. Upland Evening Primrose

Altawan.[10] I had found it again in small amounts two years later as #3951 on N.W.1/4 19-3-XXIX W 3rd, 30 June 1980. Last winter, Dr. V. L. Harms, then Curator of the Fraser Herbarium, remarked to me that no one else had ever found it, and would I look for it if I should pass that way again? I went back to Altawan in the summer of 1999 and found Upland Evening Primrose again after two days searching, as #5410 on 8 July 1999 on L.S.D.12 in 25-3-XXX W 3rd, on slightly eroded slopes at the bottom of a ravine.

As may be seen from a map, all three of the Upland Primrose sites are spanned by only a 2.4 km (1.5 mi.) stretch along the edge of a tableland. This tableland, its south edge fretted by ravines of varying depths, rises some 45 m above the flats which margin Lodge Creek, and from these flats extends north to Middle Creek at the foot of the Cypress Hills. Upland Evening Primrose is plainly a spring ephemeral, completing its life cycle in two months before the drouth of July and August. I might add that this 8 July was a horrid day - cold, cloudy, with occasional spits of rain and a fresh gale of wind from the northwest.

Annual Water Foxtail

Another spring ephemeral of southwest Saskatchewan is Annual Water Foxtail, *Alopecurus carolinianus* Walt.(Fig. 6). This was reported as #3771 from L.S.D.11 in 22-5-XXIX W 3rd, near Merryflat, in a dry slough bottom, on 17 June 1979.[10] I have a little information on this grass to relate, having run across it again as #5399 on 6 July 1999 on L.S.D.4 in 11-4-XXIX W 3rd, north of Govenlock. The habitat here was recorded as "low grassy spot in valley bottom, now dry clay." Scoggan wrote of this grass, "probably introduced in the west."[12] I think not; collection #5399 came from an undisturbed habitat. It was also seen in a dried-up state on L.S.D.14 of 33-3-XXX W 3rd on 4 August 1999 in a dry slough bottom, also undisturbed.

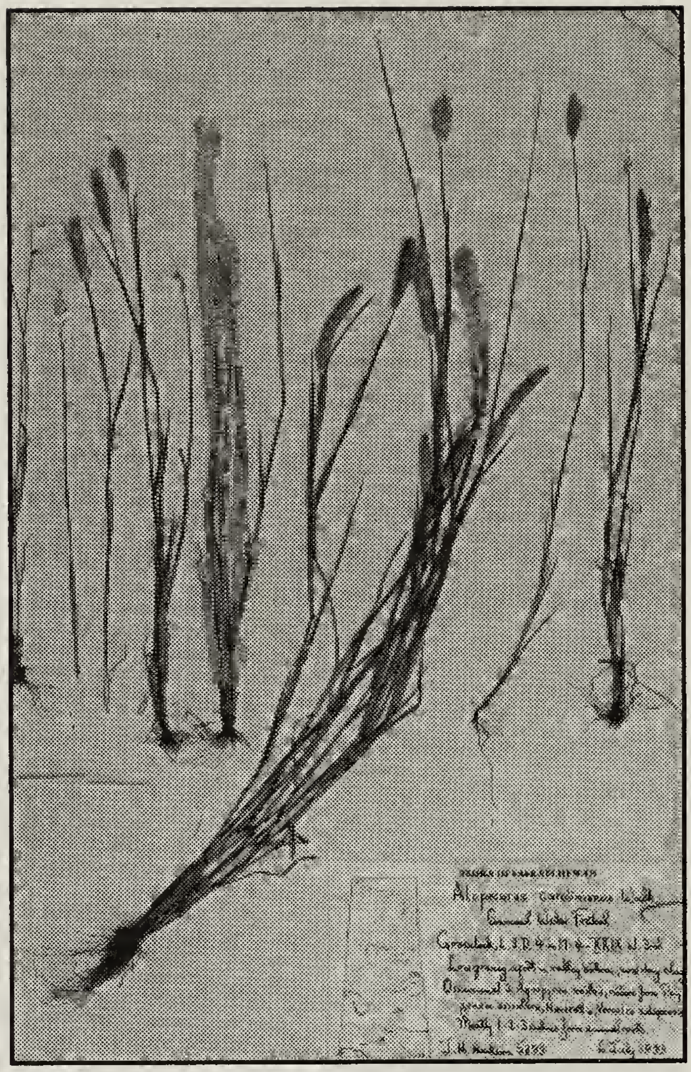


Figure 6. Annual Water Foxtail

Examination of the Fraser Herbarium holdings of *Alopecurus* showed that some of the specimens of Water Foxtail, *Alopecurus geniculatus* L., from se Alberta and sw Saskatchewan, are in fact *A. carolinianus*. This was also the case for my #358, taken 12 July 1950 in a slough bottom on L.S.D.12 in 28-17-I W 3rd, 2.4 km (1.5 miles) northwest of Mortlach. I revisited this place 20 August 1996 but, unhappily, the slough had been destroyed and its place occupied by the Trans-Canada Highway.

Annual Water Foxtail may be spotted in the field, at least in late summer, by the awns projecting from the florets remaining on the spike in such a way that the end of the column of attached florets looks whitish.

Stemless Rubber-weed

A retake of an old collection of mine was Stemless Rubber-weed, *Hymenoxys acaulis* (Pursh) Parker [*Tetraneuris acaulis* (Pursh) Greene of recent writers], # 5341, collected 24 June 1998 on the north part of L.S.D.2 in 7-16-I W 3rd, a colony about 2 m by 1.2 m at the top of the slope on the south side of a coulee. This site is among the coulees cutting the north slope of the Missouri Coteau, 11 or 12 km south of Mortlach. I had collected it at the same place as #1868 on 8 July 1956. But at that time, the only map of the area available was the old, inaccurately contoured 3 mile to the inch map, and I had recorded the location of #1868 wrongly as "N.W. corner of S.E. 1/4 of 7 - 16 - I W 3rd", which would be in L.S.D.7. It took me two afternoons in this maze of coulees to rediscover the colony.

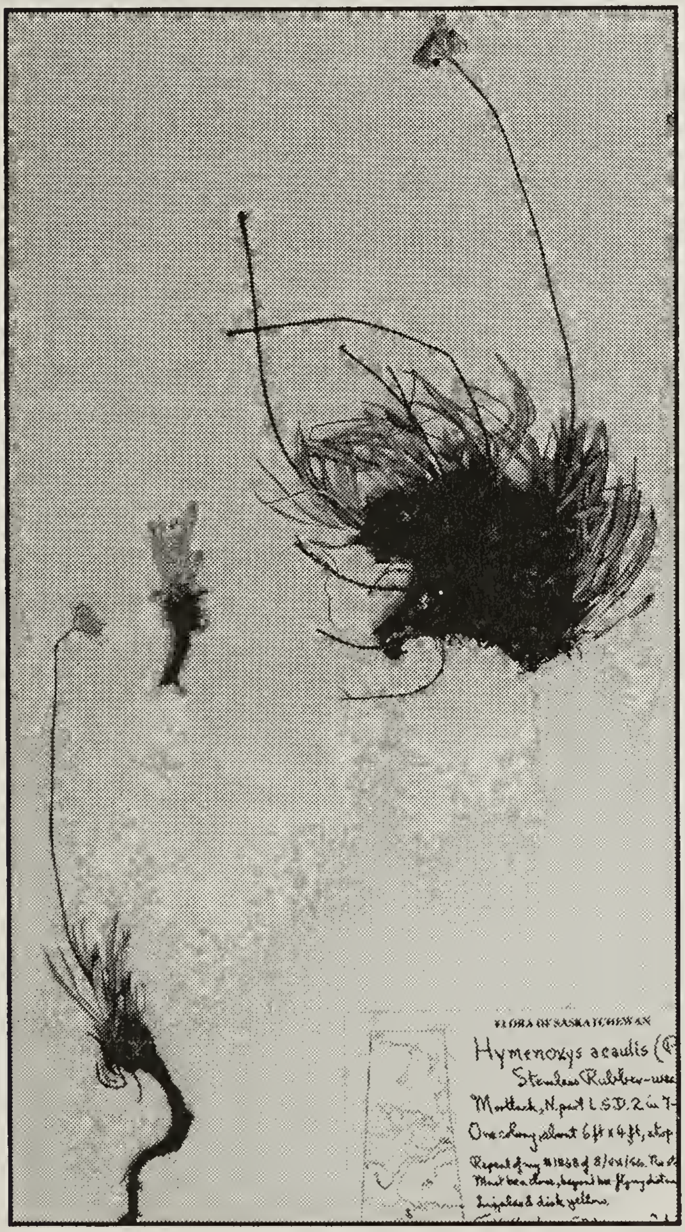


Figure 7. Stemless Rubber-weed

The colony hadn't changed perceptibly in size since 1956, and there were no daughter colonies nearby. Indeed, I have never seen Stemless Rubberweed elsewhere in Saskatchewan, though I have seen it at Writing-on-Stone Provincial Park on the Milk River in Alberta. There is a report in The Flora of Canada of a John Macoun collection from the Cypress Hills in 1894[12], but the Fraser Herbarium has no duplicate of this, nor even a photocopy.

Stemless Rubber-weed (Fig. 7) looks nothing like our familiar Colorado Rubber-weed. It lacks stem leaves and all the leaves are basal, entire and linear-lanceolate. It resembles closely Stemless Stenotus, *Haplopappus armerioides,* in plant body and flower heads and even in size, but in Stemless Rubber-weed the leaves are grey with fine pubescence, rather than hairless, green and shiny as in the Stenotus.

As mentioned earlier, there were no daughter plants or colonies nearby, nor are there other colonies that I know of in these hills cloven with coulees, and I walked every coulee along the hill front in the 1950s. This leads to two inferences : 1) Stemless Rubber-weed is self-sterile; 2) if there are any other colonies of this plant in the Missouri Coteau, this one lies beyond the flying range of the usual pollinating insects, bees and the like. The occurrence would seem to be a clone, spreading vegetatively by rhizomes, if at all. We may therefore consider this species vulnerable in Saskatchewan if the definition used by COSEWIC for national rarities is applied to the provincial level.

Replicates of my collections have been distributed to SASK (U. of S. Fraser Herbarium in Saskatoon), CAN (Vascular Plant Herbarium of the

Canadian Museum of Nature, Ottawa) and USAS (University of Regina).

[a] An L.S.D. is a legal subdivision of a section, being one-sixteenth of a section or 40 acres in size. These subdivisions are numbered in the same fashion as sections within a township. The numbers following the L. S. D. refer to section, township and range (here in Roman numerals). W. 3rd means west of the third meridian.

[The photographs show pressed specimens in the author's collection, mounted on 30 cm x 45 cm sheets of paper. Photos by Anna Leighton - Eds.]

Acknowledgements

I am indebted to Dr. V. L. Harms for giving me permission to cite his otherwise unpublished first discovery of *Leersia oryzoides*, Rice Cut-grass, in Saskatchewan.

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"There are enough people with an abnormal fear of crane flies – leggy, harmless insects – for psychiatrists to have given their fear a name : tipulophobia." ,
Sue Hubbell, Broadsides from the Other Orders, p.159.

MAMMALS

SUSPECTED SURPLUS KILLING OF GREBES BY MINK

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In June 1984, a conservation officer of the Saskatchewan Department of Parks and Renewable Resources requested assistance in investigating mortality in a nesting colony of Western Grebes in Moose Bay on the west side of Doré Lake, SK (54° 42' N; 107° 12' W). The floating nests were located in a dense stand of bulrushes (*Scirpus* sp.) about 500 m from the nearest shoreline. The water was approximately 45-90 cm deep. Dead birds were first observed on June 10. Acute infectious disease was suspected because some birds were found dead on their nests.

When I visited the site on June 13, ten dead adult birds were found in an area approximately 20 m in diameter. Three of the ten birds were on their nests and the eggs beneath these birds had not been disturbed. No dead birds were found in the colony outside of this immediate area, nor were any found in a colony in an adjacent bay. To reduce disturbance to the nesting birds, no attempt was made to estimate the total number of live birds or nests in the colony.

Eight grebes (four males, four females) were collected for examination. Seven of these had massive subcutaneous hemorrhage surrounding the back of the skull and the adjacent top of the neck (Fig. 1), and the back of the skull was crushed in four of these birds. There were small puncture wounds, each 1-3 mm in diameter, in the skin overlying the skull in all seven birds. The eighth bird, a female, was severely emaciated and had no bite wounds. No other evidence of disease was found in these birds. Lung from three of the birds was cultured for disease-causing bacteria; the only organism isolated was *Aeromonas hydrophila*, a common environmental bacterium found in water.

On July 16, 1998, dead Eared Grebes were found at Eyebrow Lake, Saskatchewan (49° 57' N; 106° 12' W). The portion of the lake where the grebes were found had a large colony of nesting Franklin's Gulls, several colonies of Black-crowned Night-Herons and Eared Grebes, and abundant nesting American Coots, waterfowl and smaller marsh birds. There had been heavy mortality of nestling and fledgling Franklin's Gulls on the lake for several years, and also annual occurrences of botulism that periodically kill thousands of waterfowl on the lake.

Among the animals collected on July 16 were four Eared Grebes found along approximately 200 m of canoe travel in dense bulrush in an area of the marsh at least 300 m from the nearest shore. One bird, an adult male with a prominent brood patch, was found immediately adjacent to an intact nest containing two

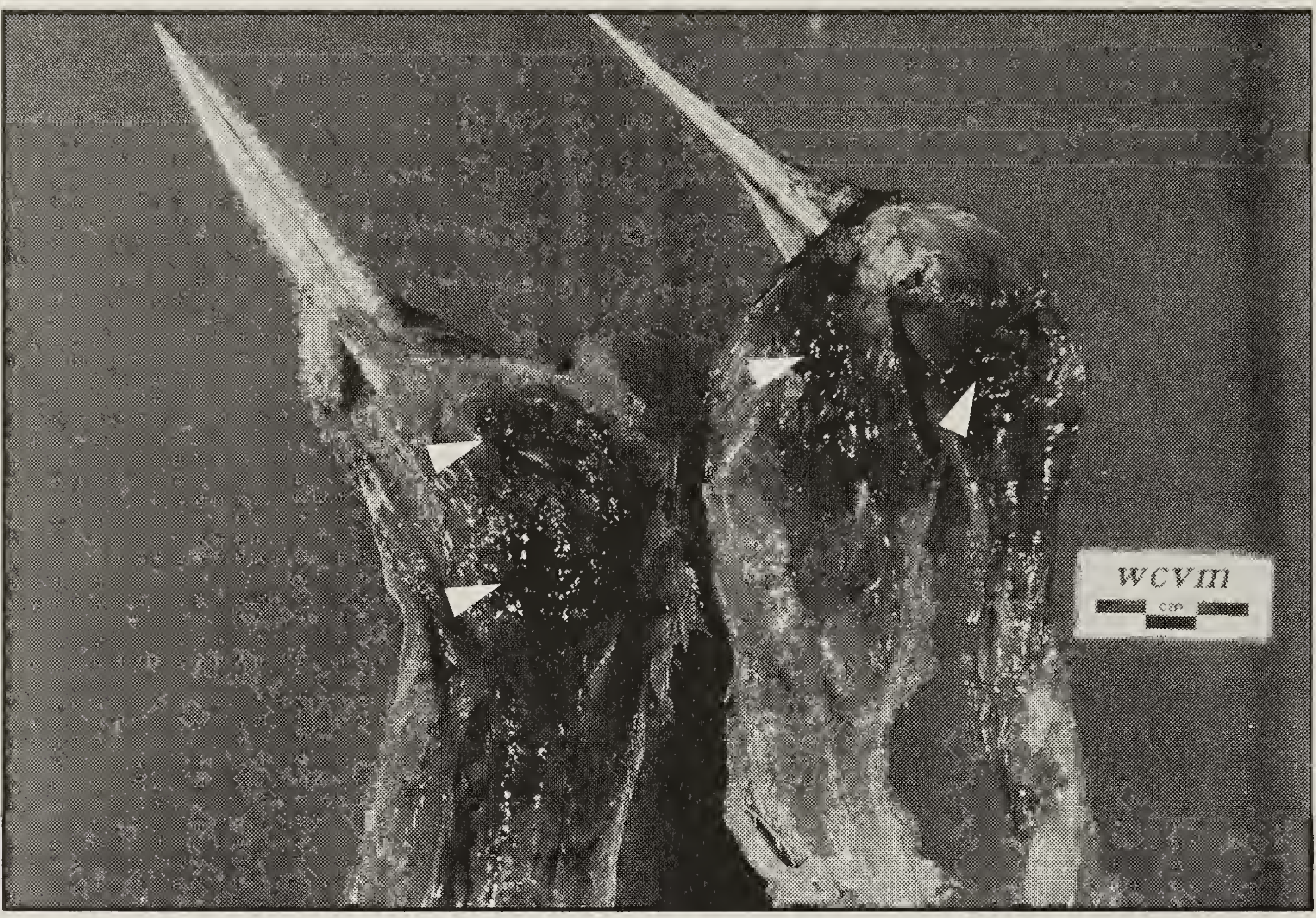

Figure 1. Predator wounds on the head and neck of two Western Grebes found dead at Doré Lake. Skin removed; dark areas are haemorrhage.

eggs. The other birds, all of which were fledglings about 75% of adult size, were floating in the water without any particular relationship to nests or to each other. All four birds had massive subcutaneous hemorrhage over the back of the skull and upper neck, and the skull was crushed in each bird. As in the Western Grebes, puncture wounds 1-3 mm in diameter were present in the skin overlying the areas of hemorrhage. In two birds, pairs of puncture wounds, which probably were made by pairs of canine teeth, were spaced approximately 1 cm apart. No other evidence of disease was detected in any of the birds; the adult was in moderate nutritional condition while all of the fledglings had abundant fat reserves.

In the same vicinity, two dead muskrats were found floating near small islands (about 10 m in diamter) constructed for nesting waterfowl. One muskrat was a recently emerged baby; the other was a half-grown juvenile. Both also had been killed by bite wounds to the occipital region of the skull.

The location and nature of the wounds in both species of grebe and in the muskrats are typical of those caused by members of the weasel family (mustelids), in which the "method of killing consists of biting the back of the neck or base of the skull, thus severing the spinal cord or crushing the occipital region." [1] Based on the size of the puncture wounds, the spacing between the canine tooth marks, and the location of the birds at some distance from shore, mink were likely the predators in both situations. The only other predator which might be considered would be otter, present at Doré Lake but unlikely to have been present at Eyebrow Lake. Otters have much larger teeth and the spacing between the canine teeth would be greater than that in the wounds found in the grebes.

The term "surplus killing" was first used by Kruuk to describe situations in which carnivores kill prey far in excess of that which can be consumed at one time.[2] In this and many other reported instances of surplus killing, a predator is likely presented with an unusual abundance of vulnerable prey under circumstances that have been dubbed the "hen house syndrome". Although grebes were not the only abundant prey species present at these sites, they may have been more vulnerable than species such as Franklin's Gulls because of greater tenacity on the nest.

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POCKET GOPHER/MOUSE ASSOCIATIONS ON THE MILK RIVER GRASSLANDS

JIM R. SALT, 464 Nelson Street, Victoria, BC V9A 6P4

Deer Mouse **Wayne Lynch**

At the beginning of the 1990s, I undertook some small mammal studies on grasslands south of the Milk River, Alberta. The principal objective was to determine the status of the smallest mammals : mice, voles and shrews. The area of interest was a grassland mosaic of Spear Grass/Grama/Wheat Grass/ Fescue (*Stipa/Bouteloua/Agropyron/ Festuca*), located partly on what is now designated the Milk River Natural Area.

Previous studies in this habitat, using portable live traps and snap traps, had convinced me that these methods would be unproductive, and I adopted visual surveys supplemented by some secondary techniques. The area examined is an irregular polygon on the south rim of the Milk River valley, southeastward from the Pinhorn Grazing Reserve across the head of Kennedy Creek. The northwest corner of the study-area was at approximately 49° 04' 36" N and 110° 50' 57" W and the southeast corner was at approximately 49° 00' 48" N and 110° 43' 59" W. In this polygon, about 32 km^2 of grassland were examined and sampled. Three types of sample configuration were used: circular plots of 500 m^2 and 1000 m^2 each; long transects or walk-lines totaling approximately 18 km, and approximately square grids of 1.1 to 2.2 km^2. All mammalian sign on these was mapped. Some transects were completely barren and were abandoned or truncated. Supplementary trapping, track-dusting and baiting at obvious communities (dens and runways) helped to determine numbers and species of animals present, and extent of use.

The immediate aim of the project was to assess the numbers and distribution of voles and mice. Information on Northern Pocket Gophers (*Thomomys talpoides*) and ground squirrels (*Spermophilus* species) was examined only seven years later, in 1998. When communities of burrowing mammals were mapped, there was a clear correspondence between pocket gopher mound-groups and the den-groups of the mouse/vole communities. Other authors have commented on the fauna that use pocket gopher dens, which include insects and spiders, salamanders, toads, and some small mammals. [3, 4, 6] Analysis of the Kennedy Creek data indicated that the mouse/ vole/gopher relationship was not a casual or occasional occurrence but was common on the study area, and might even be regarded as an ecological dependency.

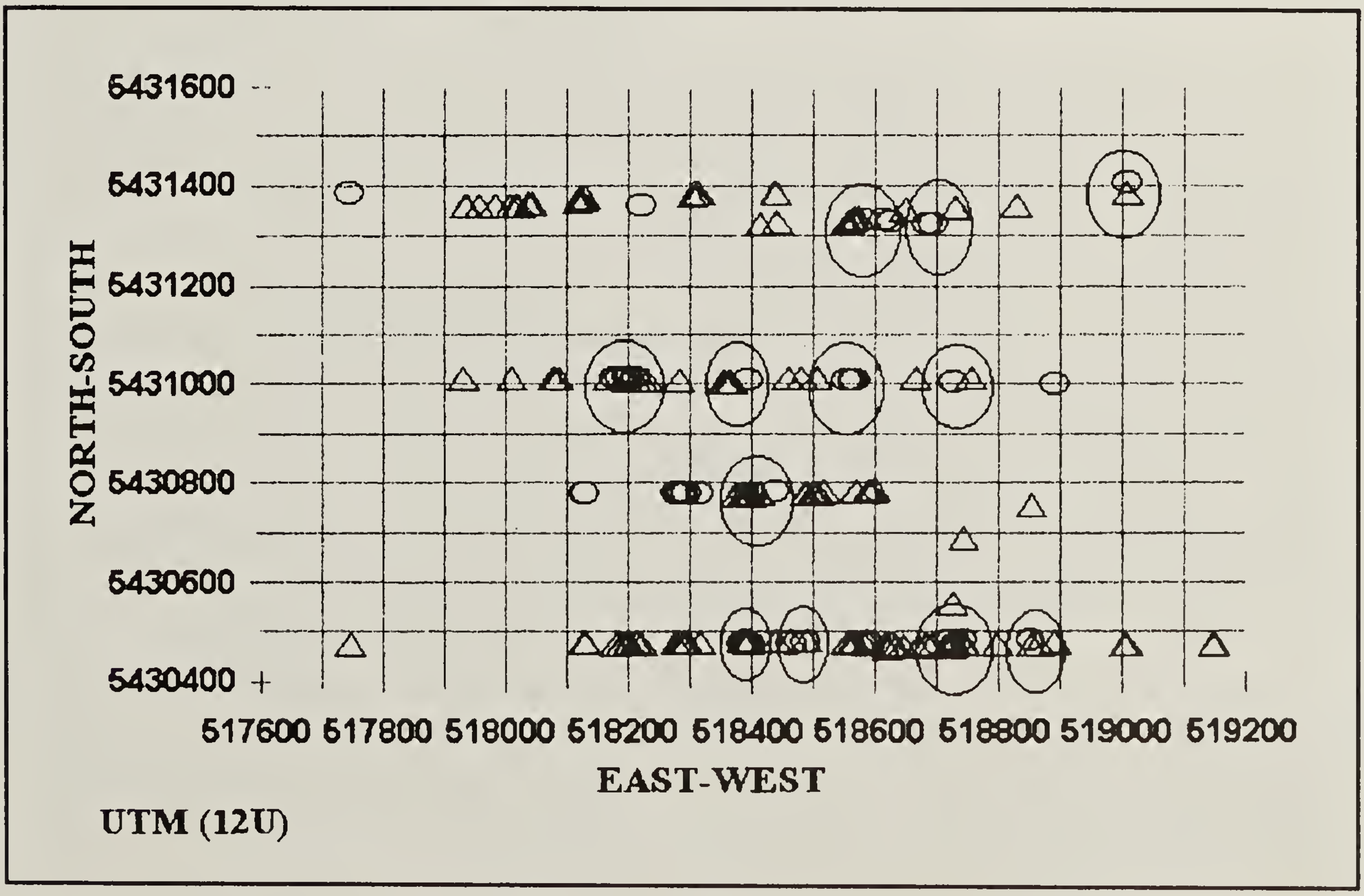
Mouse/vole den sites were widely and very irregularly distributed over the study area; most of them (about 75%) were in small clusters of six or fewer, without runways. Excepting three large communities, the density of mouse/vole den-groups varied from 0 per 100 metres (on 4 transects), to about 5 per 100 m, averaging 1.8 den-groups per 100 m (for 13 transects). Intervals between groups varied from more than 1200 metres to only three metres, and distinguishing separate den-sites over short intervals was subject to interpretation. Trapping and headlighting indicated that two different species sometimes occupied den-groups only two to four metres apart. Pocket gopher sites were more numerous than were mouse/vole den-groups, varying from 1.2 mound-groups per 100 m to over 20 per 100 m (average 6.4 sites per 100 m, on 13 transects).

Pocket gopher mounds were of several different ages. Fresh or recent ones had loose soil and a pocket gopher was still active at the site. Medium mounds showed no sign of new activity, but there was usually an occupant to re-plug dens opened by field workers. [1,2,5] A den left open might indicate that the occupant had left the site. Old mounds were compacted, partly re-vegetated, and had been abandoned for months or longer. The mice and voles were associated, not with the earth mounds, but with the feeding tunnels which extended many metres in several directions from the mounds, and sometimes led to other mound-groups.

Figure 1 indicates the distribution of mouse/vole den-groups and old pocket gopher mound-groups on a grid of four 1-km transects at the west edge of the Milk River Natural Area, on typical terrain. The X and Y axes of the graph are the Universal Transverse Mercator map references found on topographic map sheet 72 E/2. The grid lines represent 200 metre intervals.

Mice seemed to favour the sparse grasses and open ground of Spikemoss/ Everlasting (*Selaginella/ Antennaria*) communities, usually adjoining longer grass or shrub communities of snowberry (*Symphoricarpos*), juniper (*Juniperus*) and sage species (*Artemisia*). Three large den-groups were present in the study area. Each was 400 to 800 m^2, and contained well-developed runways on a part of the area with 50 to 60 den openings. These major centres all were associated with old pocket gopher tunneling, and at least 70% of small den-sites were located at old pocket gopher earth-works. Some of the isolated mouse burrows, when excavated, proved to be associated with old pocket gopher feeding tunnels, even when situated more than 10 m from the nearest mounds. The only tunneling by the mice themselves, at most communities, consisted of small simple dens with short tunnels 2 to 4 cm diameter, without earthworks or runways. They descended

Fig. 1. Community-centres of voles and mice, and abandoned Northern Pocket Gopher (*Thomomys talpoides*) mound-groups mapped on a grid 1.2 km N/S by 1.6 km E/W. Data were collected along the four transect lines shown. Triangles are old pocket gopher mound-groups, circles are mouse-vole den-groups. Large ovals indicate major associations of the two.



from 7 to 20 cm into abandoned pocket gopher feeding tunnels, 8 to 10 cm in diameter, which meandered away or led between mound-groups.

Trapping, baiting, and dusting at dens to record tracks, as well as nocturnal visual observation, proved that the larger mouse/gopher communities were inhabited by at least two, and as many as four, different small mammal species: Deer Mouse (*Peromyscus maniculatus*), Pocket Mouse (*Perognathus fasciatus*), Sagebrush Vole (*Lagurus curtatus*) and Meadow Vole (*Microtus pennsylvanicus*). Even in some smaller den-groups, Deer Mice were found with either Sagebrush Vole or Pocket Mouse. Meadow Vole was the least common species in these associations, and was found together with other species only in two large communities with extensive runways. Neither shrews (*Sorex* sp.) nor any of the "rare" mice (Harvest Mouse, *Reithrodontomys megalotis* or Grasshopper Mouse, *Onychomys leucogaster*) was detected by any of the study methods, although they had been collected previously by other workers in the same general area.

Dusting, baiting and trapping indicated that, even at large communities with obvious burrows and runways, only a few mice of any species were present. Some of the den-openings were no longer in use, and had been taken over by crickets or spiders with funnel webs or were plugged. The proportion of inactive to active dens, as indicated by dusting, varied at different communities, and seemed to be greater at larger communities where as many as 65% of the dens might be unoccupied.

Wershler noted an association between mice-voles and ground squirrel burrows in his study at the Antelope Creek Habitat Development Area, near Lake San Francisco, Alberta.[7] The pocket gopher was absent at his sites, but voles and mice seemed to rely upon the tunnels of Richardson Ground Squirrels (*Spermophilus richardsoni*). The area was described by Wershler as more than 80% Spear Grass/Grama/Wheat Grass, that is, communities superficially similar to the Milk River Grassland, but less diverse. At his first visit, his study area was much more heavily disturbed and grazed than the Milk River study area. Wershler summarized his methods and findings:

"Two straight-line 500 m transects were established in areas of high densities of Richardson's ground squirrels.... Numbers of recently active and old burrows were counted along a 5-meter transect strip, once a year in June for 5 consecutive years [1992 to 1996]....
Cricetid [mouse/vole] activity fluctuated greatly.... Centers of activity were in old ground squirrel burrow complexes .... The presence of Cricetids in upland grassland in the study area appeared to be largely dependent on the availability of old ground squirrel burrows."

In his report, Wershler referred to Richardson's Ground Squirrel as a "keystone species," in part because of the apparent dependency of the small mammal communities upon abandoned ground squirrel burrows.

My observations at Kennedy Creek, and those of Wershler at Antelope Creek, suggest that burrowing mammals, principally Northern Pocket Gopher and Richardson's Ground Squirrel, are of special significance to the small mammal ecology of the southern grasslands and thus to prairie ecology generally, particularly to mammalian predators and raptors. Major fluctuations in the burrowing mammal species could exert considerable influence, both directly upon voles and mice, and less directly upon other fauna.

I am indebted to C. Wershler for making available his data on the Antelope Creek region, and for editorial comments on an early draft of this paper.

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"Dogwood was supposedly used to build the Trojan Horse. *Cornus mas*, or cornelian cherry, was valued by the Greeks for its exceptionally hard wood, used to make javelins and spears. John Parkinson said, 'The wood...is very hard, like unto horne and thereof it obtained the name' (from *cornus*, Latin for 'horn'). How it became 'dogwood' has to do with its edible and medicinal qualities. The berries of the *Cornus mas* are said to be edible and were supposedly fed to Odysseus's men when they were changed into pigs by Circe. *Cornus sanguinea*, or English dogwood, was called by John Parkinson 'the Doggeberry tree because the berries are not fit to be eaten, or to be given to a dogge.' The Victorian garden writer John Loudon said that it was named because of a decoction of its leaves was used to wash fleas from dogs, and L. H. Bailey said in1922 that it was used to bathe 'mangy dogs.' "

Diana Wells, *100 Flowers and How They Got Their Names* p. 66

INSECTS

GOLDENROD GALLS

DON BUCKLE, 620 Albert Avenue, Saskatoon, SK S7N 1G7

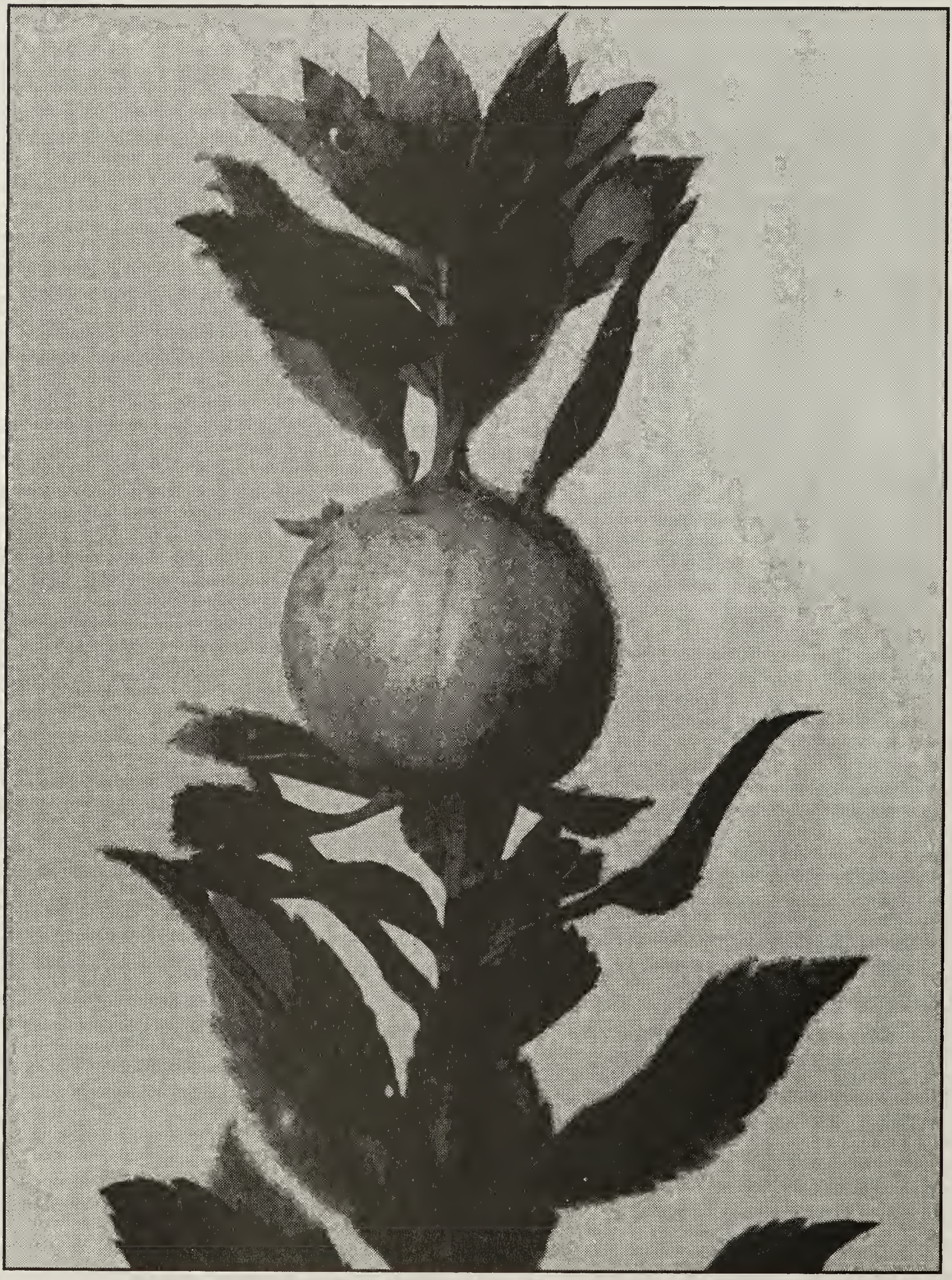

Figure 1. Goldenrod with mature gall **Don Buckle**

Yellow banks of goldenrod in bloom are the signature of autumn here in Saskatchewan. The Canada Goldenrod, *Solidago canadensis,* is common in the meadows and waste places of the Aspen Parkland. Stop for a close look at a patch of these and you will likely see round swellings on their stems (Fig. 1). What are they? Many years ago my curiosity was aroused. A quick search of the literature (it was then the 1970s) revealed little more than that they were galls made by the Goldenrod Gall Fly, *Eurosta solidaginsis,* which belongs to the fruit fly family *Tephritidae.* Over the next few years, I collected goldenrod galls, opened them at various times of the year, and reared their occupants. Little by little, details of this surprisingly complex little universe were revealed for my entertainment.

Adult Goldenrod Gall Flies emerge from the previous year's galls (Fig. 2) from mid–May to early June, depending on seasonal temperatures and local microclimate. The flies are 7 or 8 mm long, with black patterned wings. The female (Fig. 3) has a stout, strong ovipositer while the male's abdomen is blunt (Fig. 4). The male begins courting within a few hours of emerging and is especially interested in newly emerged individuals whose wings have not yet completely expanded. He will court them enthusiastically regardless of their sex. Like other fruit flies, the male gall fly performs a visual courtship in which he flaunts his patterned wings. In a typical display he stands 5–10 mm from the object of his affections, bends the trailing edges of his wings downward so that their black patterns are visible, and rocks from side to side twice per second, moving his legs while keeping his wings parallel to the surface. He then moves closer and repeats his display. Eventually, if he has shown

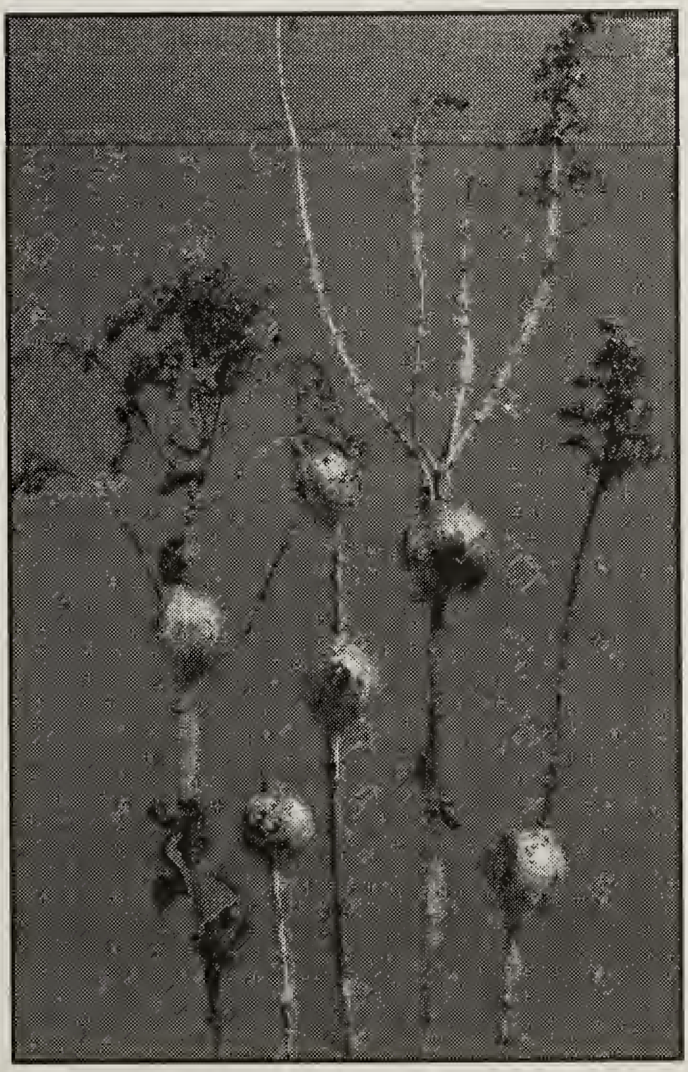

Figure 2. Previous year's galls
Don Buckle

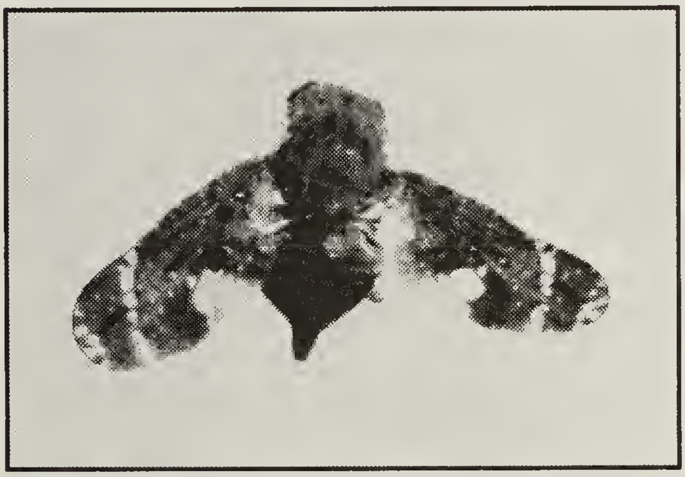

Figure 3. Goldenrod Gall Fly adult. Female ***Don Buckle***

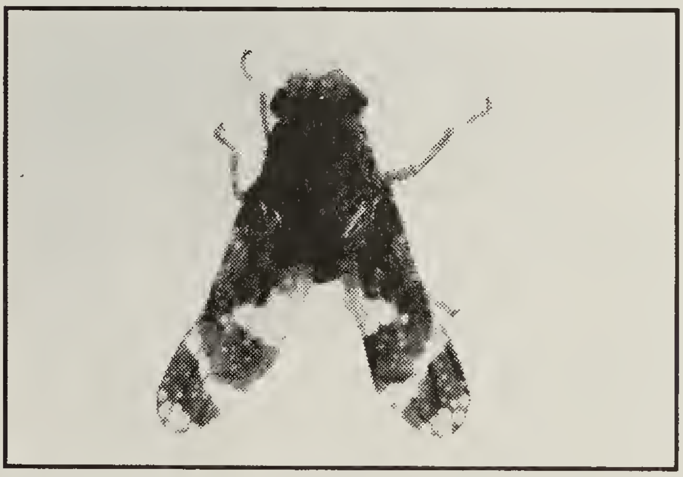

Figure 4. Goldenrod Gall Fly adult. Male ***Don Buckle***

good judgement and courted a female, mating follows.

After her eggs develop, the female seeks out goldenrod stems in which to lay them. In goldenrod patches with moderate infestations, there is usually one gall per stem, suggesting a female lays one egg then moves to another stem. In heavily infested patches, there may be two, three, or even four galls per stem. I suspect in cases of multiple galls, each is formed from an egg layed by a separate female. The goldenrod stem begins to swell in response to growth hormones secreted by the hatching fly larva. In early June, the gall is spindle shaped and no more than 4 or 5 times the diameter of the goldenrod stem. By mid–August the gall is a fully formed sphere 20–25 mm in diameter. When opened, it is found to be a hard-walled ball of pith with the larva feeding in its center (Fig. 5 & 6). Before mid–September, the fully grown larva excavates a tunnel from the center of the gall to the perimeter, leaving only a thin membrane of tissue between it and the outside world. The larva then retreats back to the centre of the gall where it settles in, facing the tunnel, to overwinter. In early spring, by the end of March or early May the larva pupates. Like many other higher Diptera, when the adult fly is ready to emerge from the pupal case, it pumps body fluids into a flexible area of its forehead which inflates like a small balloon. This bursts the pupal case. The fly then moves down the tunnel it prepared as a larva, the previous fall and uses the same technique to break through the membrane blocking the tunnel's end. It then perches on the gall for an hour while its wings dry and expand (Fig. 7). Most emergences from collected galls took place at night.

One might assume that the larva is secure, enclosed within its ball, but this is not the case. A Mordellid beetle lays its eggs in the gall and its larva consumes the gall's tissues and, frequently, the gall fly larva as well. And there are parasites to contend with. The most common is a Eutomid wasp. The female wasp inserts her ovipositer into

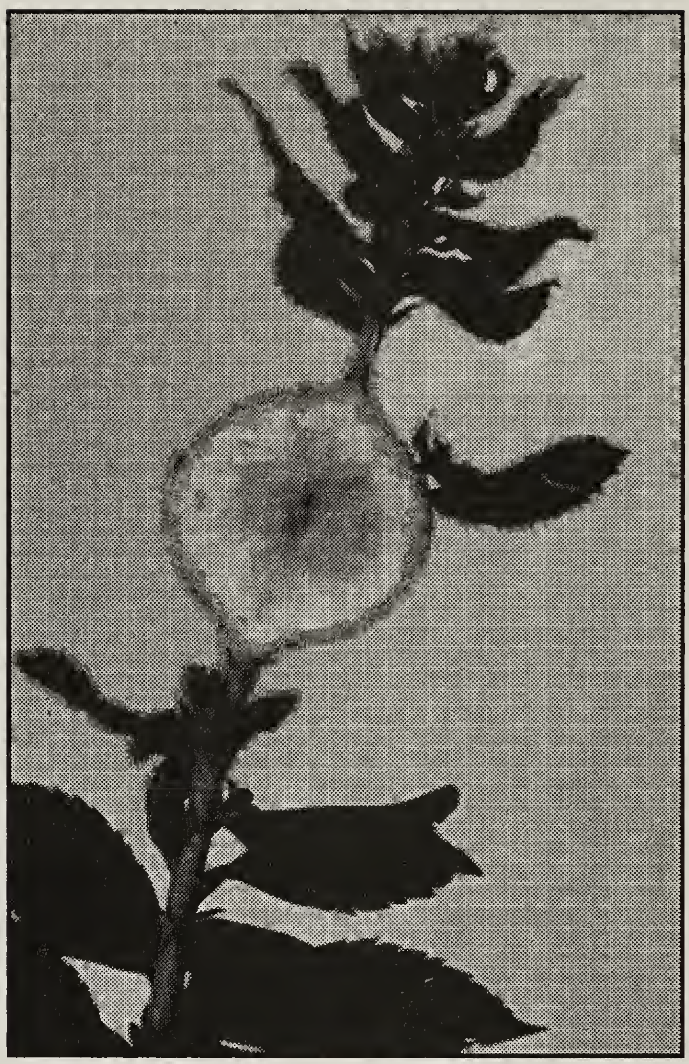

Figure 5. Cut-open gall, 12 August.
Don Buckle

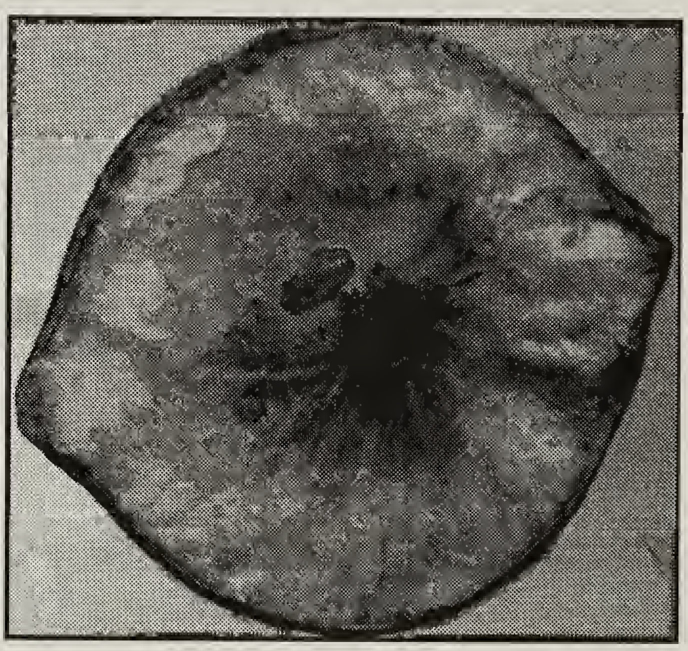

Figure 6. Close up of cut-open gall showing larva, 12 August.
Don Buckle

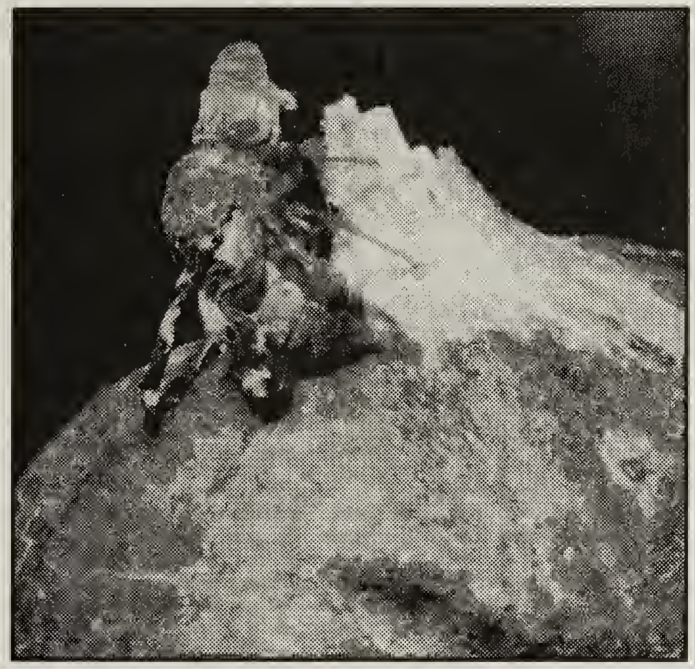

Figure 7. Newly emerged gall fly on goldenrod gall, 14 May.
Don Buckle

the gall and deposits her egg within the gall chamber where the wasp larva hatches and consumes the gall fly. The wasp emerges in the spring a few days later than the gall flies. This short delay means that the flies will have had time to lay their eggs, and that a new generation of larvae in their developing galls will be available for the wasps. There are predators as well. In an early spring search I found that a significant number of galls had been pecked open by birds over winter (Fig. 8).

Goldenrod galls are made of durable stuff and usually last a second year before disintigrating. The gall fly exit burrows become homes to a variety of small creatures, from tiny caterpillers searching for a secure place to pupate, to baby jumping spiders who line the cavities with silk and make them their homes.

In the years since I dabbled in their biology, goldenrod galls and their inhabitants have been thoroughly studied in Pennsylvania by Dr. Warren Abrahamson of Bucknell University. He has produced a long series of scientific papers on the subject, published a recent book [1], and created an excellent website: www.facstaff.bucknell.edu/abrahmsn/solidago.

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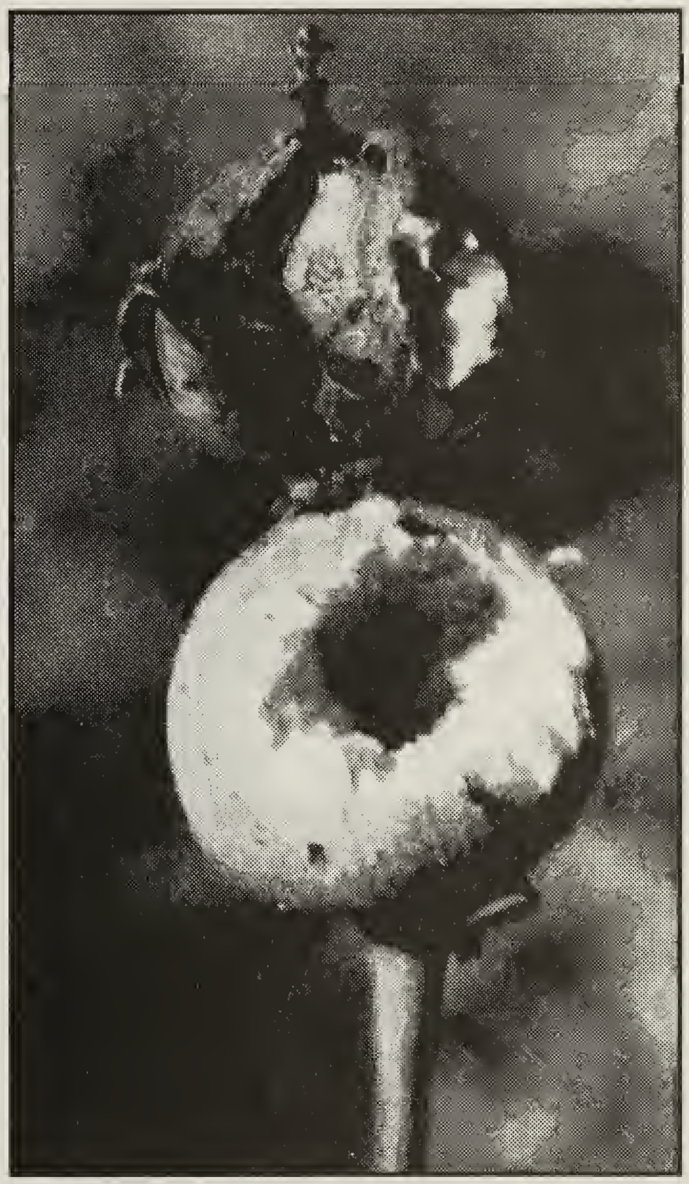

Figure 8. Gall pecked open by birds.
A. Leighton

NOTES AND LETTERS

A NORTHERN SAW-WHET OWL EGG IN A TREE SWALLOW NEST

The Northern Saw-whet Owl is an uncommon year-round resident of the Saskatoon area and much of south-central Saskatchewan.[1, 2] Only 13 locations with confirmed breeding for the entire province were reported by Smith.[2] Although one can often hear territorial males in wooded areas around Saskatoon, and some nestlings have been banded,[1] I know of no accounts of nests with eggs. This note reports an egg record for this species and some curious circumstances surrounding it.

In the fall of 1995, I erected 45 nest boxes within and just south of Saskatoon, aimed at attracting American Kestrels. These boxes measured 37 x 23 x 20 cm with a 7.5 cm entrance hole.[3] Most were placed on power poles in open areas; however, I deliberately put box number 13 on a tree within a wooded area in the hope that it might be used by a Saw-whet Owl. The area is a hydro right-of-way adjacent to the Chappell railroad yard just south of the city along township road 362-A. The right-of-way is grassy with scattered trees and is adjacent to a wooded area several hundred metres across. The dominant tree species in the right-of-way is poplar (*Populus* spp.), with some Siberian Elm (*Ulmus pumila*) and White Spruce (*Picea glauca*), along with hedges of willow (*Salix* spp.) and Caragana (*Caragana arborescens*). To date, box 13 has not been occupied by either a kestrel or an owl. However, an adjacent box, number 12, on a power pole in the open was used by a Saw-whet Owl in 1996.

On 11 June 1996 I checked each nest box for nesting activity. Box 13 contained a partial nest of a House Wren. Box 12 had a Tree Swallow nest that covered the entire bottom of the box. Towards one corner of the box, where the nest cup was located, a female Tree Swallow was incubating a clutch. However, in addition there was a conspicuously large, white egg positioned on top of the nesting material in the middle of the box a few centimeters away from the swallow. When I next returned to this box on 5 April 1997, the large egg was intact and in the same position it was when last seen. Based on the size, (29.7 x 23.2 mm), shape and colour, and a comparison with eggs in the collection at the Biology Museum of the University of Saskatchewan, I conclude the egg could only have come from a Northern Saw-whet Owl.

There are three things that are curious about this observation. The first is that despite the availability of nest box 13 surrounded by trees, the owl chose box 12 which was on a power pole surrounded by grass (about 100 m from the woods). Usually, Saw-whets are described as being birds of dense woods.[4] Although box 13 was occupied by wrens, this is likely of little consequence. Owls are on territory in April long before the spring arrival of wrens, so it seems unlikely that the owl was prevented from laying in the box in the woodland. Secondly, this must have been a very late nesting owl. As 1996 was the first year these boxes were available for breeding, the Tree Swallow nest was built in late May or early June and the owl egg was clearly laid on top of the completed nest. Salt and Salt report that egg sets have been found in Alberta as early as 18 April and as late as 8 June.[4] However, to begin laying in early June is exceptional, for young Saw-whets in the Saskatoon area are known to fledge by mid- to late June.[1] Thirdly, what was the swallow doing while the owl laid? At the time that the owl egg must have appeared, the Tree Swallow was either incubating a full clutch, or still laying.

Nest box 12 has been used annually by kestrels since 1996, and box 13 has been unoccupied.

Acknowledgements
I thank the Natural Sciences and Engineering Research Council of Canada for funding my research program on kestrels.

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- *Gary R. Bortolotti,* Department of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, SK S7N 5E2

SERENDIPITOUS BIRDING

Birding is sometimes frustrating, at times difficult, but always wonderful. Occasionally the unexpected will happen, giving a memory never to be forgotten.

On Thursday, May 25, 2000, I was in Waskesiu for some meetings, and had a little time over the dinner hour to do some birding. I drove to the Waskesiu River, and when approaching the footpath, saw a flock of eight small colourful birds resting on the guardrails. I knew they were warblers, but I had never seen the species before. I walked towards them, watching them in my binoculars and uttering the birder's prayer : "Please, don't fly away until I know what you are!"

I was able to walk within 20 feet of the birds, put down my binoculars, pull out my bird book and leaf through the section on warblers. I came to what I thought was the appropriate page and again looked at the birds. While in this position, and holding the book in both hands, one of the birds flew towards me and landed on the book. He gazed at me intently, for at least 30 seconds. His look seemed to say, "I know you're having trouble identifying me; I know I'm a rare bird, so have a good look." It was remarkable because my book was open to the right page, and I was able to see his picture while looking at the real thing.

The bird was a Cape May warbler, and no, it didn't point to its picture on the page.

- *Doug Schmeiser*, 22 Simpson Crescent, Saskatoon, SK S7H 3C6

CONCENTRATION OF BLACK TERNS

On Sunday, June 11, 2000, I arrived at what is locally called Fish Lake, 10 km north and 4 km east of Canwood, Saskatchewan, near the southern boundary of Prince Albert National Park. The former Blue Heron post office was at the tip of this lake. It was windy, cold

(7° C) and raining. The lake is over 4 km long, but narrow.

Many thousands of Black Terns were flying over the lake, against the wind. I presumed they were feeding but they did not pick up fish; their beaks barely touched the surface of the lake. Each tern would fly against the wind for about 100 m, then let the wind carry it back, and then fly again over the surface of the water. This lasted all day until dark.

Monday morning was sunny and warmer. The terns were back, but not as many of them. They were feeding on mosquitoes at tree-top level along the shore. By noon, most had left.

Can anyone explain where so many terns came from, and why? They should have been paired and nesting in marshes. I have never seen so many Black Terns in one place, and never before flying against a strong wind when it was cold and wet.

It looked great from inside my warm cabin.

- *Mel Moline*, Box 185, Asquith, SK S0K 0J0

THE HISTORY OF COLLARED-DOVES IN WEYBURN, SASKATCHEWAN

In April of 1999 John Whitell noticed two doves that were different from the Mourning Doves that he normally saw in the Weyburn area. He contacted some of the birding folks in town. It was their opinion that he was seeing escaped Ringed Turtle-Doves.

In the autumn of the year he met me and asked me to go out to the eighteenth hole of the golf course where the two doves roosted.

Subsequently, Carol Bjorklund and Bob Luterbach viewed the birds and concluded that they were, indeed, Eurasian Collared–Doves as I suggested after my rendezvous with John.

Two European field guides and the usual complement of North American field guides were consulted to establish the identity of these birds as Eurasian Collared-Doves. As well, Bob Luterbach drew on his previous experience with the species.

Over the winter John maintained his bird feeders at the golf course. The two doves remained all winter and made use of John's food supply. Come spring the two Collared-Doves were still to be found at their favoured roosts. They continued to be seen as a pair until the beginning of May, 2000. Then only one was regularly seen, while the other disappeared.

The singing bird was seen and heard at intervals throughout the period. Finally, on July 14 both birds were seen perched together on a branch in one of their favourite trees. No young were seen. It is assumed that the female remained long on an unsuccessful nest.

We now wait with interest to see whether the two birds will once again winter at Johnnie's golf course feeder.

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Field Guide to the Birds of North America, 1999, National Geographic Society, Washington, D.C.

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- *Martin Bailey*, 102 - 1833 Coteau Avenue, Weyburn

GREAT BLUE HERON COLONY AT DORÉ LAKE, SASKATCHEWAN

In the last issue of *Blue Jay*, Lenita Hanson and Al Smith requested that observations of Great Blue Heron colonies not already documented in their data be placed on record. To this end, I offer the following entry from my field notes made at Smith Island, Doré Lake, SK (54° 48' N., 107° 35' W.) on 14 July, 1996.

"In the white spruce-aspen forest about 250 m north of the southwest tip of Smith Island and halfway between the east and west coasts is a breeding colony of Great Blue Herons with about 10 to 15 nests. The nests are all at about 10 m height in the branches of aspen trees and consist of 0.75 to 1.5 m diameter, 0.5 m high masses of small branches and twigs. The nests with young can be identified by the 2 to 3 m diameter areas of white droppings on the forest floor below. Other things on the ground below the nests include egg shells – some containing yolk rests and thus not hatched – twigs, feathers of adult birds, and three carcasses of downy and partly feathered chicks. Each active nest appears to contain one or two adult-sized chicks which have feathers and are at first sight mistaken for adult birds. However, younger chicks may be present but out of view. In the half hour we spend below the nest, about five adults arrive. When an adult lands on a nest, the chick(s) respond(s) by uttering loud raucous calls and then uttering shorter begging noises until – presumably – it/they is/are being fed. Within a few minutes, the adult leaves the nest. It was this calling of the young which alerted us to the presence of the colony. Some of the chicks look at us but neither chicks nor adults appear alarmed at our presence."

This Great Blue Heron breeding colony had been noted a few years earlier by Rod Laliberte of Doré Lake town when he spent a few days camping by the sandy bay on the southwest side of Smith Island. After he told me about it in 1994 or 1995, I went to look in the area that he indicated, but did not find the colony site. Kevin Keel and I came across it by chance in 1996, as described here.

- *Thijs Kuiken*, Middenmolenlaan 141, 2807EV Gouda, The Netherlands

Red-breasted Nuthatch

Edna Sproule

THE NUTHATCH STORY CONTINUES

My first article describes how we helped a pair of nuthatches excavate a nest cavity in our neighbour's crab apple tree in April 1998.[2] The story resumes on April 27, 2000.

I was visiting Mary Pattison, on Bottomley Avenue, Saskatoon, and I saw a pair of nuthatches pecking a knot-hole in her Mountain Ash tree, 7 feet five inches above the ground. Bits of wood pulp were flying in all directions. The ground at the base of the tree was white with pulp. Mary and my six-year-old grandson, Christopher, watched with me for fifteen minutes as the birds prepared the nest hole. We left so as not to disturb the birds but returned each day until the cavity was complete. Our guess is that incubation began about May 1.

On May 13 we watched the male bring insects and sunflower seeds to the incubating (or brooding?) female who poked her head out of the hole to accept them. On May 21, after accepting food, the female went for a short flight with her mate to a spruce tree; after several minutes she returned and hovered at the entrance several times before settling in. That day, the nuthatches were clearly feeding young, bringing food every few minutes. The heads of the young appeared, accompanied by much chirping, each time an adult arrived. On May 27, both adult nuthatches were absent for more than 30 minutes, but finally did return with food. Perhaps all but one of the young had already fledged.

Ghalambor and Martin tell us that the incubation period is 12-13 days and that they leave the nest when 18 to 21 days old.[1]

Meanwhile, my neighbour's knot-hole in the apple tree, used by the nuthatches in 1998, has been used by Black-capped Chickadees this year. We first noticed them at the hole, six feet above ground, on April 18. By May 17, the incubating female chickadee came out of the nest, stretched her wings, and then flew off. By May 27 and May 29, they, too, were busy feeding their young every few minutes.

We did not observe the young nuthatches or chickadees leave their nest cavities. We hope both knot-holes will be used again in 2001.

1. Ghalambor, C.K., and T.E. Martin, 1999. Red-breasted Nuthatch (*Sitta canadensis*), *In* The Birds of North America, No. 459 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

2. Sproule, Edna. 1999. How we helped a Red-breasted Nuthatch. *Blue Jay* 57:115.

- *Edna Sproule,*1338 Colony Street, Saskatoon, SK S7N 0S7

REMOVAL OF NEST MATERIAL FROM A NEST BOX BY WHITE-BREASTED NUTHATCHES

My observations of a pair of White-breasted Nuthatches expand on those of Polish ornithologist Tomasz Wesolowski. He states: "Causes of the disappearance of nest material [in natural cavities] are unknown."[1] He also notes " ... it is the accumulation of old nest material rather than the removal of such material, that distinguishes nest boxes from natural cavities."

In the mild winter of 1999-2000, I transferred a nest box from our front yard to a position about 2.5 m up and on the side of a large spruce tree by our back window. This box, about 0.6 m above a bird feeding tray, was originally put up to attract House Wrens. A young Red Squirrel had taken it over the previous fall, enlarged the opening to about 5 cm diameter, and filled the box with fine bark strips and dead grass.

The day after I moved the box, the squirrel discovered the new location and re-occupied it. It would stay in the box, come out to feed, and then return to its snug quarters. After all, it lived only 0.6 m above a tray of sunflower seeds. Sometimes it emerged to drive off other squirrels. Now and then it simply peered out, then went back to sleep.

In February, I live-trapped about six squirrels from our yard, including the nest box occupant. Thereafter, a number of birds, all regular visitors to the several feeders in my yard, showed an interest in the vacated nest box, occasionally flying up to it and peering into the opening. These included House Sparrows, White-breasted Nuthatches, and once, a Downy Woodpecker and a Black-capped Chickadee. In late March, nuthatches could be heard calling almost daily. A pair, showing courtship display and aggressive behaviour towards other nuthatches, one day entered the box. My wife and I were excited, for it looked as if they might nest there.

The male nuthatch, with brighter plumage, was the first to enter the box. Once, briefly, both were in the box at the same time. For about a week in early April, the presumed female nuthatch entered the box almost daily and brought out old squirrel nest material. This was exciting. On several days she would disappear into the box, only to emerge a few minutes later with a wad of debris in her bill. Several times we saw her poke her head out of the hole, drop debris, then disappear back in again. Other portions of the debris were placed carefully to one side of the nest hole and some were deposited on the roof of the box. When the female remained inside the box for several minutes, we wondered what she was doing – redecorating? Our hopes were high, but always, after a few minutes, the pair flew off. Perhaps they had a natural cavity nest site elsewhere?

A month later, long after the nuthatches had ceased visiting the next box, I examined it. Nothing remained of the copious fibrous bedding left by the squirrel. The nuthatch, or nuthatches, had emptied the box except for about 1 cm of old dusty fine material on the floor.

It appears that the White-breasted Nuthatch, which nests in natural cavities and boxes, has an interest in visiting alternate nest sites. It may even spend time and energy on extensive renovations, removing nest materials. Might it do the same in natural cavities?

Jim Duncan kindly commented on this note.

[1] Wesolowski, T. 2000. What happens to old nests in natural cavities? Auk 117:498-500.

- *Robert W. Nero,* 546 Coventry Road, Winnipeg, MB R3R 1B6

LIFE AT A NORTHERN BIRD FEEDER

On husband Gordon's retirement on 1 July 1994, we moved from Coleville to our home on the shores of Murphy Lake, 13 miles west of Loon Lake, Saskatchewan.

At first, we had trouble with White-tailed Deer eating our sunflower seeds – until we put out rancid flour; this seemed to drive them away. Red Squirrels proved useful in one respect; they drove away the House Sparrows.

Our feeder is four feet above the ground, just outside our living room window. The winter of 1999-2000 was great for birds – we used 1400 pounds (28 bags) of black sunflower seed and

120 pounds of niger seed. Each day we had a dozen Blue Jays, 20 or 25 Black-capped Chickadees, two Red-breasted Nuthatches and two White-breasted Nuthatches visiting us. For much of the winter we had 65 to 70 Evening Grosbeaks and four Pine Grosbeaks. Six Hairy and four Downy woodpeckers visited our suet block. All winter we had an unprecedented 150 Common Redpolls; the first Hoary Redpoll appeared with the Purple Finches in early April.

We continued to feed the spring migrants and summer residents. In mid-May, a pair of Gray Jays brought their four young to our feeder, the first family of this species to visit us. There were two pairs of Rose-breasted Grosbeaks that came and went from opposite directions and later brought their families to the feeders. We also had two pairs of Baltimore Orioles, the first to visit us in six years. A pair of American Robins raised their young on our suet. We had Ruby-throated Hummingbirds at our five plastic sugar feeders (containing one part sugar to four of water) and a Rufous Hummingbird stopped briefly in late May.

The biggest thrill was a tiny nuthatch with a gray-brown cap, which we identified as a Pygmy Nuthatch. It stayed for two days in mid-May and as it visited our suet, it allowed us close views and comparisons with our field guide (A Guide to Field Identification; Birds of North America by Robbins, Bruun, Zim and Singer). I have learned since that this is a species that breeds in southern British Columbia , northern Idaho and extreme western Montana, but is known to wander outside of its breeding area in winter.[1] We did not take its photograph and thus cannot fully document the apparent first record for this species in Saskatchewan.

In July, a yearling Black Bear was a pest. It ate two plastic hummingbird feeders. Then, on July 7, it entered a bear trap brought for the purpose and the conservation officer hauled it the minimum distance of 40 km.

1. Campbell, R.W. et al, Birds of British Columbia. Volume 3. pp. 286-291

- *Beth Dales*, Box 625, Loon Lake, SK S0M 1L0

A LETTER ABOUT SLIME MOLDS AT CANDLE LAKE

While hiking in late June on a trail in the Candle Lake area maintained by Sask Forestry Association (Aschim Homestead Trail), I stopped to admire a large clump of Spotted Coralroot and was thrilled to find a slime mold on a fallen aspen. I could clearly see the wispy strands of slime, showing its progress up the side of the log and along its upper surface, much in the same way a slug leaves a slime trail. It looked like the coral slime on page 90 of Mushrooms of the Boreal Forest by Eugene Bossenmaier. The next time I got back there, July 24, there was a crusty brown/black residue on the log but none of the stringy white trails or puffy white fruiting bodies seen previously. Any suggestions as to where to look for more information on slime molds? They aren't usually covered in the regular mushroom books.

- *Ruth Griffiths*, 17 24th Street East, Prince Albert, SK S6V 1R3

WEEDS OF CANADA AND THE NORTHERN UNITED STATES

France Royer and Richard Dickinson. 1999. The University of Alberta Press / Lone Pine Publishing, 434 pp. Soft cover $29.95 ISBN 0-88864-311-X

Here's a fine addition to a botany library – one of the best guides I've seen for identifying weedy plant species. A bonus for us, the Prairie Provinces are right near the middle of the area covered: Alaska to Newfoundland, south to northern California and Virginia.

Which species are branded as "weeds"? The authors' definition is "any plant growing in an area where it is not wanted." For this book they have chosen common, widely distributed species. Other factors affecting their choices include potential for future problems and official weed designation. The result is coverage of 175 species in 48 families.

The book has two parts; the first section consists of pictorial keys which direct users to the species descriptions in the second section. The keys are for mature plants, seedlings, and grasses. All are based on simple leaf arrangements and structures, followed by thumbnail photos showing flowers or whole plants. Mature plants are also keyed by flower colour which is coded on the edges of the pages of the key.

The descriptive text section is arranged alphabetically by English name of the plant families. Each family has a 2-page general description and is assigned a colour which flags the pages featuring members of that family. Species are arranged within the family alphabetically by scientific name. Each species has two facing pages where concise and thorough information is laid out. The common name is given, followed by the scientific name (with synonyms for both), as well as French names. Quick identification features highlight what to look for right away, then there are detailed descriptions, including photos, of seeds, seedling, leaves, flower, plant and fruit structures. Distribution information includes where, within a plant's geographic range, it is officially designated a noxious weed. There are explanations of the plant's weediness, including information on toxicity. A very useful feature is the description of similar species that are not necessarily weeds.

The book is useable by everyone from a novice gardener to an experienced botanist. Information is accessible to someone scanning the book to identify a problem plant as well as the person wanting a detailed description of a particular species. A good straightforward, illustrated glossary at the back explains unfamiliar terms. The bibliography covers books on weeds, publications on specific weeds, and general species guides. A single index enables a person to find a plant by common English, scientific, or French names.

A lot of careful thought went into the layout and production of this book, from the 750 superb photos to the handy little ruler (Imperial and metric) on the plasticized back cover. Try it; I think you'll like it.

Reviewed by Judy Haraldson, W.P. Fraser Herbarium, Dept. of Plant Sciences, University of Saskatchewan. Available from the Blue Jay Bookshop.

BIRDS AT YOUR FEEDER: A GUIDE TO FEEDING HABITS, BEHAVIOR, DISTRIBUTION AND ABUNDANCE

Erica H. Dunn and Diane L. Tessaglia-Hymes. 1999. W. W. Norton, New York. 418 pp. Illus. 200 x 120 cm. Hard cover $42.00. ISBN 0-393-04737-7.

This book summarizes information derived from Project Feederwatch, a continent-wide survey by feeder watchers that began in 1987. In1994, the year used as the basis of the book's maps, nearly 6000 volunteers recorded, for two days every two weeks from November until early April, the numbers of birds seen at his or her feeder.

Ottawa's Ricky Dunn and her co-author concentrate on the 88 species, 38 of which occur in Saskatchewan, that visit ten percent or more of the feeders in any of the eight continental regions. Another 80 species, 52 of which occur in Saskatchewan, have been recorded less commonly and do not merit a full species account. There is also a list of mammals which visit feeders, either to share the bird feed or to eat the birds themselves!

Coverage of each species includes background on the history, behaviour, foraging habits (including caching), habitat, and physiology. For each species, favourite foods are listed and a graph depicts the mean number of birds present, the number of periods they are present, and the months when they most often occur. Two informative maps for each species depict abundance and the percent of feeders visited, and alone justify purchase of this book. The Slate-colored Junco is the most widely distributed species, visiting over 80% of feeders across the continent.

Fascinating tidbits of information abound. Anna's Hummingbirds lose weight on sugar water alone, so require protein from the equivalent of 38 tiny flies each day. One Evening Grosbeak downed 96 sunflower seeds in less than five minutes, and a flock of 100 consumed the contents of a 50-pound bag in18 days; in summer one grosbeak will eat a thousand budworm larvae per day. One Chipping Sparrow will consume 2 1/4 pounds of seeds during one winter, sixty times its body weight. Boreal Chickadees may cache surplus food, for the short term, in camouflaged sites on the under sides of a branch, while Red-breasted Nuthatches cache seeds in crevices on tree trunks. Clark's Nutcrackers and Pinyon Jays, on the other hand, may hide thousands of seeds for use months later.

The Mourning Dove, if it has a plentiful supply of water, can tolerate a body temperature of 113° F. A Brown-headed Nuthatch may use a loose scale of bark to pry up other bits of bark. An American Tree Sparrow returned to the same wintering area for eight consecutive he had told her enthusiastically how the muskrats had increased at Rousay Lake a few miles south of her farm. She married him in spite of the muskrats.

As his nephew Don McKen said at Jack's funeral, "Jack had a strong and dominating personality, a strong sense of right and wrong, and an aura of certainty, steadfastness, and confidence. ... He was an entertaining and effective speaker. ... But he had a softer side as well; he was able to see equal beauty in a prairie flower, a prairie gopher, a bear, a moose, a lake, a butterfly, and yes, indeed, a muskrat."

In 1955, Jack was transferred to Regina and promoted to Supervisor of Game, responsible for wildlife law enforcement across Saskatchewan. He developed a hunting and gun safety manual for new training programs, and this manual remains largely intact today. He often spoke at wildlife federation meetings. In his spare time he hosted a sportsman's show on CKCK television, where his efforts behind and in front of the camera won him three national awards for excellence. He and Ellen purchased a summer cottage in the Qu'Appelle Valley, roughly halfway between Regina and her relatives near Yorkton.

In 1967, the Canadian Wildlife Service (CWS) lured him to a position in Edmonton as Head of Regulations and Enforcement. He founded the North West Wildlife Law Enforcement Officers Association. When he took early retirement in 1980, A.H. MacPherson, Regional Director-General of CWS, said that Jack was "an impressive and skilful communicator," with an affinity for rural residents. After retirement Jack became president of the Stony Plain Fish and Game League and served one term as president of the provincial body. For a month each year he taught gun and hunter safety courses at the Renewable Resources School at Fort Smith, NWT, but his greatest love was his magnificent flower garden. He died in Edmonton just a month before his 75th birthday, on June 14, 2000. He is survived by his wife, daughters Connie and Cathy (twins) and Laurel, and five grandchildren.

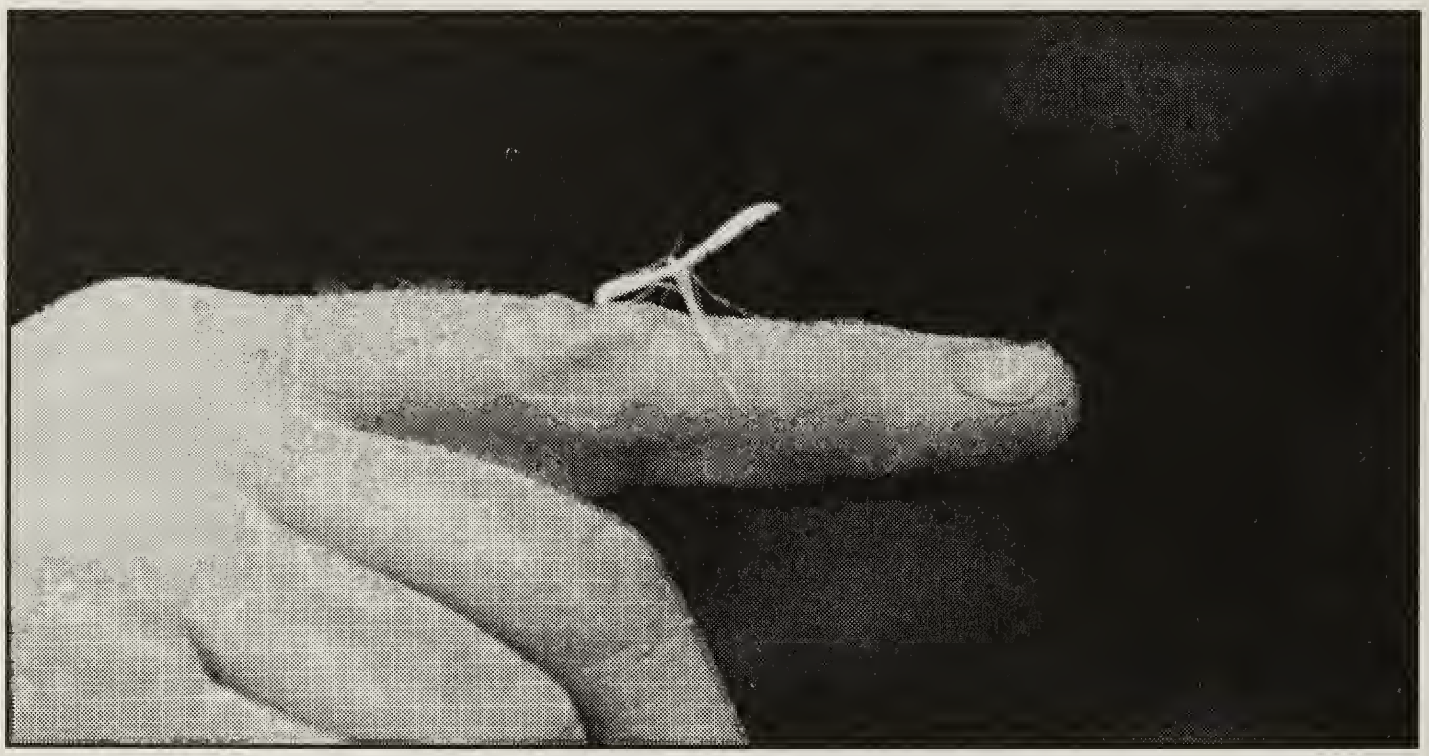
As Don McKen said, "Jack will be remembered as an active, passionate, involved, and dedicated man, who loved and cherished his family, and who helped make the world a better place."

I acknowledge major assistance from the funeral eulogy prepared by Don McKen, whose own interests began with a present from his Uncle Jack, Peterson's *Field Guide to the Birds.*

* Each year Jack commented on how decent it was of the Government of Canada to give everyone a holiday on his birthday.

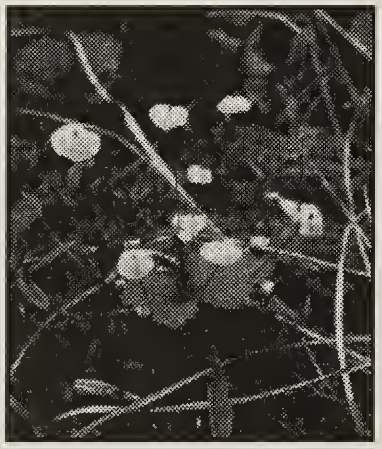
"In 1924, three billion orange and black painted lady butterflies flew at about six miles per hour from Northern California to Southern California and on into Mexico." by Joanne E. Lauck, *The Voice of the Infinite in the Small* 1998 p. 270

MYSTERY PHOTO



This insect masquerading as a miniature propeller, was photographed near Ketchen, SK in June 1999 by Shirley Johnston. What is it?

Answer for JUNE 2000 MYSTERY PHOTO



The tiny parasols on slender threads belong to a MOSS called Yellow Collar Moss or Fairy Parasols (*Splachnum luteum*). The parasol structure is the sporophyte. Because this moss grows only on animal droppings - usually moose - getting spores to new sites for growth poses a bit of a problem. The moss enlists the help of insects. Lured by odours produced by the moss, insects land on the parasols, pick up spores and transfer them to new piles of droppings which they visit to lay eggs.

Several readers sent in correct responses : Reed Barclay, Ruth Griffiths and Michael Goodyear, who, in July, had the remarkable coincidence of seeing a second species of Collar Moss in northern Saskatchewan. Thank you all for writing in. I would also like to thank those who identified the photo as a mushroom - for that is what I also assumed it to be when I took the photograph.

This atypical moss is well illustrated in several field guides : Plants of the Western Boreal Forest and Aspen Parkland by Johnson, Kershaw, MacKinnon and Pojar, and Mosses, Lichens and Ferns of Northwest North America by Vitt, Marsh and Bovey.

The editors would like to thank René Belland, University of Alberta, for confirming the identity of the mystery photo.

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